SECTION 00 90 10
ADDENDUM NO. 3

Project: Gallman Place Roof Renovation
Newberry, SC 29108
23234 – A

Date: 16 April 2026

To: All Bid Document Holders

This Addendum forms a part of the contract documents and modifies the bidding documents with amendments and additions noted below.

Acknowledge receipt of this addendum in the space provided in the bid form. Failure to do so may render the bid unresponsive.

Manufacturers and products indicated as an "approved substitution" shall be accepted as equal for the manufacturers given in the contract documents. It is understood that the products submitted for these manufacturers must still meet the specifications of the project, and can be rejected if after review, are determined to be not equal to the product called out in the contract documents.

GENERAL

- Roof core samples were taken by a third-party company today. Because we will not have the results until next week, the written questions and bid due date have been changed to:
  - Written Questions Due: May 1, 2026 at 5:00PM
  - Bid Due Date: May 7, 2026 at 3:00PM
  - Construction Start Date: Second Week of June 2026
- Roofing core sample results will be sent to all bidders as an addendum.
- Approved Substitutions: Refer to attached TPO Membrane Submittals; Approval conditional on confirmation that membrane is available in the specified finish, attachment style, and warranty.

PROJECT MANUAL

Section 00 11 13 – INVITATION TO BID – REVISED

- Revised dates:
  - Written Questions Due: May 1, 2026 at 5:00PM
  - Bid Due Date: May 7, 2026 at 3:00PM
  - Construction Start Date: Second Week of June 2026

DP3 Architects, Ltd.
15 South Main Street
Suite 400
Greenville, SC 29601
864.232.8200

www.DP3architects.com

ATTACHMENTS:

- Section 00 11 13 – INVITATION TO BID – REVISED
- TPO Membrane Substitution Submittal - Carlisle Syntec Sure Flex TPO
- TPO Membrane Substitution Submittal – GAF Everguard 60 Mil Fully Adhered TPO Roof System

END OF SECTION

SECTION 00 11 13
INVITATION TO BID - REVISED

Newberry County (Agency) is soliciting sealed bids from qualified contractors for improvements to the Gallman Place Roof located at 540 Brantley Street in Newberry, SC 29108.

This solicitation is intended to promote competition. If any language, specifications, terms and conditions, or any combination thereof restricts or limits the requirements in this solicitation to a single source, it shall be the responsibility of the interested vendor to notify the Purchasing Director in writing within five (5) days prior to the opening date. The solicitation may or may not be changed but a review of such notification will be made prior to the award.

For a complete bid package, please visit:

https://www.newberrycounty.gov/purchasing/solicitations

Important Dates:

MANDATORY PRE-BID MEETING:	**April 1, 2026**	**10:00 AM**
Pre-Bid Meeting Location:		
Gallman Place		
540 Brantley Street		
Newberry, SC 29108		
WRITTEN QUESTIONS DUE:	**May 1, 2026**	**5:00 PM**
BID DUE DATE:	**May 7, 2026**	**3:00 PM**
CONSTRUCTION START DATE:	**Second Week of June 2026**	

Due Date:

Please submit one (1) sealed packets to the address listed below using the following Bid Envelope Label. At the call of time, the bids will be opened and publicly read aloud. Faxed, e-mailed, or late bids will not be considered. Mail or hand-deliver to:

Newberry County
Attn: Crystal Waldrop
1309 College Street
P.O. Box 156
Newberry, SC 29108
Phone: 803.321.2100

BID ENVELOPE LABEL:

NEWBERRY COUNTY – GALLMAN PLACE ROOF REPLACEMENT
GENERAL CONTRACTOR'S NAME
GENERAL CONTRACTOR'S ADDRESS
COUNTY BID NUMBER: 2026-02
DATE OF SUBMISSION

Bidder Responsibilities and Requirements:

All prospective bidders must participate in a Pre-Bid meeting. The Pre-Bid meeting shall be at the proposed site unless an alternate location is listed above. **Failure to attend this meeting shall be grounds for rejection of bid.**

Deadline for questions is listed in the Important Dates above.
Questions shall be sent in writing by e-mail to Laurel Getty at lgetty@dp3architects.com and copied to Josh Kale at jkale@claytonconstruction.net.

Prices submitted are valid for **60 days**.

Project Description:
The Project includes improvements to the Gallman Place Roof, including approximately 30,000 SF of the existing high school; Excluding the roof over the gymnasium.

The project is located at 540 Brantley Street, Newberry, SC 29108.

Construction disciplines required for the project include, but are not limited to:

Site work:	None
Concrete:	None
Masonry:	None
Metals:	Miscellaneous metal. Roof flashings and trim.
Wood & Plastics:	Rough wood carpentry and trim
Thermal & Moisture Protection:	Single Ply Membrane and Tapered Polyiso Insulation
Doors & Windows:	None
Finishes:	None
Specialties:	None
Equipment:	None
Furnishings:	None
Special Construction:	None
Conveying systems:	None
Plumbing:	None
Mechanical:	None
Electrical:	None
Sprinkler System:	None

CSI Form 1.5C

SUBSTITUTION REQUEST
(During the Bid Period)

Project: Gallman Hall Reroof Project

Substitution Request Number:

From: Bill Wheeler / Santee Roofing

To:

Date: 4/15/2026

A/E Project Number: 24021

Re: Roofing Sub Request

Contract For:

Specification Title: TPO Roofing 07 54 23

Description: TPO

Section: Page:

Article/Paragraph:

Proposed Substitution: Carlisle Syntec Sure Flex TPO

Manufacturer: Carlisle Address: 1285 Ritner Hwy Carlisle PA 17013 Phone: 717-479-6832

Trade Name: Carlisle TPO Model No.:

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Bill Wheeler

Signed by:

Firm: Santee Roofing

Address:

Telephone:

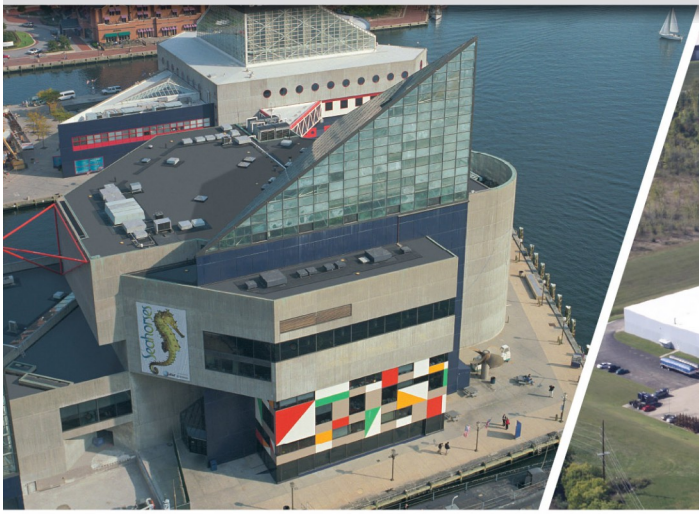
A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

CARLISLE
SYNTEC SYSTEMS



Gallman Place Reroof

Gallman Place Reroof

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GOLDEN SEAL TOTAL ROOFING SYSTEM WARRANTY

WARRANTY NO.:
BUILDING OWNER:
NAME OF BUILDING:
BUILDING ADDRESS:
DATE OF COMPLETION OF THE CARLISLE TOTAL ROOFING SYSTEM:
WARRANTY START DATE:
WARRANTY EXPIRATION DATE:

Carlisle Roofing Systems, Inc., (Carlisle) warrants to the Building Owner (Owner) of the above described building, that; subject to the terms, conditions, and limitations stated in this warranty, Carlisle will repair any leak in the Carlisle Roofing System (Carlisle Total Roofing System) installed by a Carlisle Authorized Roofing Applicator for a period of -- years, commencing with the date of Carlisle's acceptance of the Carlisle Total Roofing System installation. However, in no event shall Carlisle's obligations extend beyond --.5 years, subsequent to the date of completion of the Carlisle Total Roofing System. See above for the exact date of warranty expiration.

The Carlisle Total Roofing System is defined as the following newly installed Carlisle brand materials: Membrane, Flashings, Adhesives and Sealants, Insulation, Cover Boards, Fasteners, Fastener Plates, Fastening Bars, and Insulation Adhesives utilized in this installation.

TERMS, CONDITIONS, LIMITATIONS

1. Owner shall provide Carlisle with written notice via the online leak report form, phone, letter, fax, or email within thirty (30) days of any leak in the Carlisle Total Roofing System. See Carlisle's Care and Maintenance Guide, which accompanies this warranty, for contact information. By so notifying Carlisle, the Owner authorizes Carlisle or its designee to investigate the cause of the leak. Should the investigation reveal the cause of the leak to be outside the scope of this Warranty, investigation and repair costs for this service shall be paid by the Owner.

2. If, upon inspection, Carlisle determines that the leak is caused by a defect in the Carlisle Total Roofing System's materials, or workmanship of the Carlisle Authorized Roofing Applicator in installing the same, Owner's remedies and Carlisle's liability shall be limited to Carlisle's repair of the leak. Carlisle shall have sole responsibility in determining the method of repair of the area.

3. This warranty shall not be applicable if, upon Carlisle's inspection, Carlisle determines that any of the following has occurred:
(a) The Carlisle Total Roofing System is damaged by: natural disasters, lightning, fire, insects, animals, windblown debris or objects, earthquakes, tornados, hail, hurricanes, and winds of (3 second) peak gust speeds in excess of -- mph measured at 10 meters above ground; or
(b) Loss of integrity of the building envelope and/or structure, including, but not limited to, partial or complete loss of roof decking, wall siding, windows, roof top units, doors or other envelope components; or
(c) All associated building components, including but not limited to the deck substrate, joists, columns and foundation, must also meet wind speed design requirements.
(d) The Carlisle Total Roofing System is damaged by any acts, or accidents, misuse, abuse, vandalism, civil disobedience or the like; or
(e) Deterioration or failure of building components, including, but not limited to, the roof substrate, walls, mortar, HVAC units, non Carlisle brand metal work, wood nailer, etc., occurs and causes a leak, or otherwise damages the Carlisle Total Roofing System; or

800-233-0551 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7121 | www.carlislesyntec.com

(f) Deterioration of metal materials and accessories caused by marine salt water, atmosphere, or by regular spray of either salt or fresh water; or
(g) Acids, oils, harmful chemicals and the like come in contact with the Carlisle Total Roofing System and cause a leak, or otherwise damage the Carlisle Total Roofing System; or
(h) The Carlisle Total Roofing System encounters leaks or is otherwise damaged by condensation resulting from any condition within the building that may generate moisture; or
(i) The Carlisle Authorized Applicator or any additional contractor or subcontractor failed to follow Carlisle's published specifications and details for the approved system assembly or failure to correct all installation deficiencies listed in any Carlisle inspection report.

4. This Warranty shall be null and void if any of the following shall occur:
(a) If, after installation of the Carlisle Total Roofing System by a Carlisle Authorized Roofing Applicator, there are any alterations or repairs made on or through the roof or objects such as, but not limited to, structures, fixtures, solar arrays, wind turbines, roof gardens or utilities are placed upon or attached to the roof without first obtaining written authorization from Carlisle; or
(b) Failure by the Owner to use reasonable care in maintaining the roof, said maintenance to include, but not be limited to, those items listed on Carlisle's Care & Maintenance Guide which accompanies this Warranty.

5. In addition, it shall be Owner's sole responsibility to remove and re-install at Owner's expense, all obstructions, including, but not limited to, structures, fixtures, solar arrays, wind turbines, roof gardens, utilities or other overburden from the affected area as determined by Carlisle that would hinder or impede repairs being made in the most expedient and least expensive manner possible. Owner shall be responsible for all costs associated with any loss of power generation in the event that removal of a solar array is required to repair the roofing system.

6. During the term of this Warranty, Carlisle shall have free access to the roof during regular business hours.

7. Carlisle shall have no obligation under this Warranty while any bills for installation, supplies, service, and/or warranty charges have not been paid in full to the Carlisle Authorized Roofing Applicator, Carlisle, or material suppliers.

8. Carlisle's failure at any time to enforce any of the terms or conditions stated herein shall not be construed to be a waiver of such provision.

9. Carlisle shall not be responsible for the cleanliness or discoloration of the Carlisle Total Roofing System caused by environmental conditions including, but not limited to, dirt, pollutants or biological agents.

10. Carlisle shall have no liability under any theory of law for any claims, repairs, restoration, or other damages including, but not limited to, consequential or incidental damages relating, directly or indirectly, to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in the building or in the air, land, or water serving the building.

11. This warranty shall be transferable upon a change in ownership of the building when the Owner has completed certain procedures, including a transfer fee and an inspection of the Roofing System by a Carlisle representative.

12. Any dispute, controversy or claim between the Owner and Carlisle concerning this Limited Warranty shall be settled by mediation. In the event that the Owner and Carlisle do not resolve the dispute, controversy or claim in mediation, the Owner and Carlisle agree that any and all suits, proceedings, or claims shall be filed in either the state courts of Cumberland County, Pennsylvania or in the United States District Court for the Middle District of Pennsylvania. Each party irrevocably consents to the jurisdiction and venue of the above-identified courts.

800-233-0551 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7121 | www.carlislesyntec.com

13. Roof System Design Assembly: Carlisle, as manufacturer of commercial roofing products with the sole purpose of offering products for an Owner, design professional, architect, consultant, or engineer when designing/choosing a roof system assembly, assumes no liability nor implies to the suitability of the products for any particular assembly or specific building operation or structure. The Owner, design professional, architect, consultant, or engineer is solely responsible for the assembly chosen for a particular building structure to include the responsibility to properly calculate wind uplift values, design dead loads and live loads, and suitability and condition of building envelope substrate, decking, parapets, drainage, slope, and other attributes pertaining to the performance of the roof system assembly.

14. The Carlisle Authorized Applicator or any additional contractor or subcontractor are not agents of Carlisle.

CARLISLE DOES NOT WARRANT ANY PRODUCTS UTILIZED IN THIS INSTALLATION WHICH ARE NOT DEFINED ABOVE AS THE CARLISLE TOTAL ROOFING SYSTEM AND SPECIFICALLY DISCLAIMS LIABILITY, UNDER ANY THEORY OF LAW, ARISING OUT OF THE INSTALLATION AND PERFORMANCE OF, OR DAMAGES SUSTAINED BY OR CAUSED BY, PRODUCTS NOT FURNISHED BY CARLISLE OR THE PRIOR EXISTING ROOFING MATERIAL OVER WHICH THE CARLISLE ROOFING SYSTEM HAS BEEN INSTALLED.

THE REMEDIES STATED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES FOR FAILURE OF THE CARLISLE TOTAL ROOFING SYSTEM OR ITS COMPONENTS. THERE ARE NO WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, WHICH EXTEND BEYOND THE FACE HEREOF. CARLISLE SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGE TO THE BUILDING OR ITS CONTENTS UNDER ANY THEORY OF LAW.

BY:

AUTHORIZED SIGNATURE
TITLE: Sr. Manager, Technical and Warranty Services

800-233-0551 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7121 | www.carlislesyntec.com

Carlisle Care and Maintenance Guide

In order to ensure the long-term performance of your Roofing System and continued warranty service and coverage, regular rooftop maintenance inspections are necessary. While normal aging will occur on all roofs, if not detected early, problems stemming from abuse, contamination, accidents and severe weather can result in extensive and costly repairs or premature failure of the roofing system. Single-ply Roofing Systems are typically low-slope and easy to inspect, but caution must be taken to ensure safety. Carlisle disclaims and assumes no liability for any rooftop activity.

- Owner must retain records related to the Roofing System. Such records include, but are not limited to: the warranty document and serial number, maintenance inspection logs, rooftop traffic logs, service logs, and invoices for work performed on the roofing system.
- Inspect the roof at least every six months (preferably spring and fall) and immediately following any weather event that includes excessive rainfall, high winds and/or hail warnings. Increased number of rooftop maintenance inspections may be required on some roofs as the location may dictate, such as higher trees near the building which will accumulate leaves and debris on the roof and have adverse effects on drainage. In addition, rooftop maintenance inspections should occur after regular maintenance of any rooftop unit.

When inspecting the Roofing System, pay special attention to the following:
- Walls/Parapets/Roof Edge – Wind damage often begins at the perimeter of the roof. Ensure all membrane terminations and edge metal and copings are secure.
- Roof Deck Membrane – Inspect the field of the roof, scanning for damage caused by wind-blown debris or traffic.
- Penetrations/Rooftop Units – Inspect the membrane, flashings and terminations around penetrations and roof top units for possible damage from service work. Ensure the units and terminations are secure.
- Remove debris (leaves, dirt, trash, etc.) – Good roofing practice dictates that water should drain from the roof and that ponded water should evaporate within 48 to 72 hours after a rainfall. Debris can inhibit drainage.

Additional Maintenance Items:
- Foot Traffic – Walkways must be provided if regular traffic is required or if rooftop equipment has a regular thirty (30) day or less maintenance schedule.
- Petroleum Products & Chemicals - Keep all liquids containing petroleum products or chemicals off the membrane to avoid product degradation.
- Animal Fats/Vegetable Oils: EPDM Membranes - Do not exhaust animal fats/vegetable oils directly onto EPDM roof surfaces. TPO & PVC Membranes – Animal fats/vegetable oils must be regularly removed and the rooftop surface cleaned with a mixture of soap and water.

What to do if a leak occurs:
- After verifying the leak is through the roofing system, contact Carlisle at 1-800-233-0551 or at www.carlislesyntec.com.
- If minor, emergency temporary repairs are made to a suspected leak area, use Carlisle's Lap Sealant or a good-grade rubber caulk to address the repair area (do not use asphaltic roof cement). Please note, Carlisle is not responsible for the cost associated with any emergency temporary repairs.

Alterations to the Roofing System:
- Alterations to the Roofing System must be completed by a Carlisle Authorized Applicator. The Carlisle Authorized Applicator must notify Carlisle when the revision work is complete. The necessary form can be found on the Carlisle website via the Authorized Applicators login.

Warranty Transfer:
- Warranties shall be transferable upon a change in ownership of the building when the Owner has completed certain procedures. This form can be found on the Carlisle website for additional guidelines.

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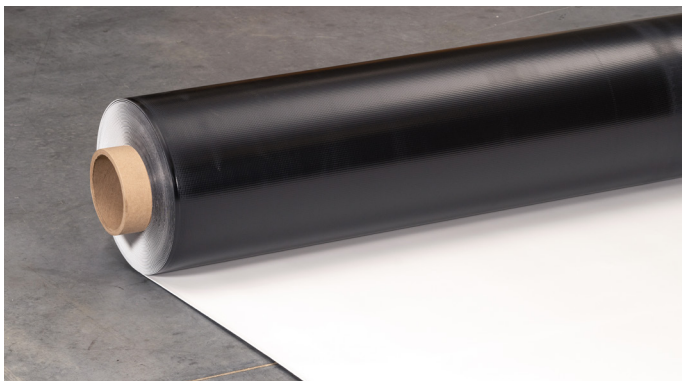
CARLISLE SYNTEC SYSTEMS

Sure-Weld® TPO
Reinforced Membrane



Overview

Carlisle's Sure-Weld TPO reinforced membrane is a premium, heat-weldable, single-ply thermoplastic polyolefin (TPO) sheet designed for new roof construction and re-roofing applications. Sure-Weld High Slope (HS) membrane is formulated with additional flame retardant for higher-slope fire code approvals. Sure-Weld Extra is 80 mils (2.03 mm) thick for significantly higher strength and weatherability.

Sure-Weld TPO membranes use advanced polymerization technology that combines the flexibility of ethylene-propylene (EP) rubber with the heat weldability of polypropylene. All Sure-Weld TPO membranes include OctaGuard XT™, an industry-leading, state-of-the-art weathering package. OctaGuard XT technology enables Sure-Weld TPO to withstand the extreme weatherability testing that is intended to simulate exposure to severe climates.

Physical properties of the membrane are enhanced by a strong polyester fabric that is encapsulated between the TPO-based top and bottom plies. The combination of the fabric and TPO plies provides high breaking and tearing strength, as well as excellent puncture resistance. The relatively smooth surface of the membrane produces a total surface fusion weld that results in a consistent, watertight, monolithic roof assembly. The membrane is environmentally friendly and safe to install.

Features and Benefits

- Living Building Challenge "Red List Free" – Declare Label
- Sure-Weld TPO is available in 4- and 6-ft (121.92 cm and 182.88 cm) perimeter sheets and 8-, 10-, 12-, and 16-ft (243.84 cm, 304.80 cm, 365.76 cm, and 487.68 cm) Sure-Weld field sheets*
- Sure-Weld High Slope TPO is available in 5', 10', and 16' (152.40 cm, 304.80 cm, and 487.68 cm) sheets
- Outstanding puncture resistance and excellent fire resistant assemblies
- HS formula opens assemblies for slopes greater than ½" over combustible and non-combustible deck types where standard TPO is restricted
- Environmentally friendly and stable formulation
- Excellent resistance to impact and low temperatures
- UL 2218 Class 4 hail rating
- Manufactured with non-halogenated flame retardants
- Excellent chemical resistance to acids, bases and restaurant exhaust emissions
- Exceptional resistance to heat, solar UV, ozone and oxidation
- Manufactured using a hot-melt extrusion process for complete scrim encapsulation
- Enhanced with the OctaGuard XT weathering package

OCTAGUARD XT WEATHERING PACKAGE

- Standard Colors:

White | Gray | Tan

- Special Colors:

Slate Gray | Med Bronze | Terra Cotta | Patina Green | Rock Brown

*Sure-Weld HS Special Color TPO membranes are available in 5'- and 10'-wide sheets. Refer to Carlisle's Sure-Weld TPO Color Palette Sell Sheet for details. Sure-Weld 80-mil in special colors are limited to warranties up to 20 years.

Sustainable Attributes

Carlisle SynTec Systems' focus has always been innovation — Innovation to solve problems, improve performance, reduce labor, and above all, improve sustainability. Carlisle is committed to driving sustainable and efficient processes in the design and manufacturing of our products.

- Up to 10% pre-consumer recycled content
- Fully recyclable when used in mechanically attached systems
- 3rd-party verified Environmental Product Declaration available
- NSF P151 certification for rainwater catchment**
- California Title 24 compliant***
- Free of Living Building Challenge red list chemicals

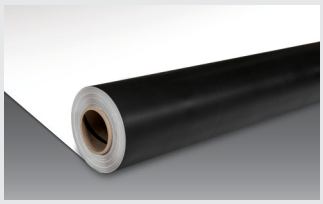
**White only, produced in Tooele, UT and Carlisle, PA
***White and Tan only

Installation

Sure-Weld TPO roofing systems are quick to install, as minimal labor and few components are required. TPO systems are installed using an Automatic

Sure-Weld TPO
Reinforced Membrane

Wider is Better



Carlisle's 16-foot Sure-Weld TPO delivers a leap in productivity on adhered and induction welded roofs by cutting down on the number of rolls needed and dramatically reducing the number of seams on the roof.

With fewer rolls to load, stage, and kick out, and fewer seams to weld, contractors can save significant time on each project, moving on to the next one sooner.

16-Foot TPO Benefits

- Fewer rolls to load and stage on a job saves crane time and labor at the beginning of each project
- Fewer rolls to position, kick-out, and align during installation saves labor
- Up to 60% fewer seams vs. 10-foot TPO
- Fewer seams to weld, probe, and inspect, saving considerable time during installation
- Fewer T-joint patches to install on each roof
- Less waste and trash from packaging
- Less time spent on each project, allowing contractors to complete more roofs and grow their business
- Available in High Slope formulation in white and gray colors

Heat Welder, making sheet welding fast, clean, consistent, and easy to learn, while reducing strain on the roofing technician.

Fully-Adhered – membrane is adhered to a suitable substrate utilizing an appropriate bonding adhesive

Mechanically Fastened – membrane is attached to the roof deck over a suitable substrate utilizing plates and fasteners which are overlapped with membrane

Induction-Welded – membrane is attached over a suitable substrate via an induction welding tool being placed over the membrane where a fastened TPO induction welding plate is located to weld the two components together

Review Carlisle specifications and details for complete installation information.

Precautions

- Sunglasses that filter out ultraviolet light are strongly recommended, as tan and white surfaces are highly reflective. Roofing technicians should dress appropriately and wear sunscreen.
- Surfaces may become slippery due to frost and ice buildup. Exercise caution during cold conditions to prevent falls. Exercise caution when walking on wet membrane. Membranes may be slippery when wet.
- Care must be exercised when working close to a roof edge when the surrounding area is snow-covered, as the roof edge may not be clearly visible.
- Use proper stacking procedures to ensure sufficient stability of the rolls.
- Store membrane in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable, waterproof tarpaulins. Membrane that has been exposed to the weather must be prepared with Weathered Membrane Cleaner prior to hot-air welding.
- Take care not to stand or place heavy objects on the edge of folded-over membrane, as this could cause a hard crease in the membrane.
- Maximum sustained temperature not to exceed 160°F (71°C) for TPO membrane.
- Do not use razor blades or other sharp tools to cut the APEEL Protective Film while it is still adhered to the TPO membrane as damage to the underlying membrane may occur. Pull the protective film away from the membrane prior to cutting.
- Remove APEEL Protective Film by pulling towards the center of the roof. Do not remove the film by pulling towards the roof edge.
- A static electric charge may develop when removing APEEL Protective Film from the surface of the membrane sheet. To avoid the possibility of ignition, lids must be closed on any flammable products and a fire extinguisher should be readily available.
- Color membranes will 'fade' over time mainly due to the ultraviolet portion of sunlight. Since most roof surfaces are exposed to variable sunlight, some areas will be more susceptible to color changes caused by UV fading. Warranties for color membranes do not cover fading of colors.

Extreme Testing for Severe Climates

ASTM Standard D6878 is the material specification for Thermoplastic Polyolefin-Based Sheet Roofing. It covers material property requirements for TPO roof sheeting and includes initial and aged properties after heat and xenon-arc exposure. As stated in the scope of the standard, "the tests and property limits used to characterize the sheet are values intended to ensure minimum quality for the intended purpose." Carlisle's goal is to produce TPO that delivers maximum performance for the intended purpose of roofing membranes. Maximum performance requires the membrane to far exceed the requirements of ASTM D6878.

Heat Aging accelerates the oxidation rate that roughly doubles for each 18°F (10°C) increase in roof membrane temperature. Oxidation (reaction with oxygen) is one of the primary chemical degradation mechanisms of roofing materials.

Carlisle Testing – Heat Aging

	ASTM Requirement	Sure-Weld Requirement
ASTM TEST 240°F	32 weeks**	>128 weeks

**Heat exposure comparable to 3,120 weeks (60 years) at 185°F for 8 hours/day.

- Test specimen is a 2" by 6" (50.8 mm by 152.4 mm) piece of 45-mil (1.14 mm) membrane unbacked, placed in circulating hot-air oven.
- Criterion – no visible cracks after bending aged test specimen around 3" (76.2 mm)-diameter mandrel.

Q-Trac testing combines accelerated weathering with real-world conditions using an array of ten mirrors to reflect and concentrate full spectrum sunlight onto membrane test specimens. The Q-Trac device automatically tracks the sun's path from morning to night. Also, it adjusts to compensate for seasonal changes in the sun's altitude. Eight years in Q-Trac testing is equal to 40 years of real-world exposure. Carlisle requires its Sure-Weld TPO membranes to pass the equivalent of 40 years of exposure in the Q-Trac.

Carlisle Testing – Q-Trac

	ASTM D6878 Requirement	Sure-Weld Requirement
ASTM TEST N/A	N/A	Equivalent of 40 years of exposure

Environmental Cycling subjects the membrane to repeated cycles of heat aging, hot-water immersion, and xenon-arc exposure.

- ASTM requirement – none
- Carlisle Extreme test*:
  - 10 days heat aging at 240°F (116°C) followed by
  - 5 days water immersion at 158°F (70°C) followed by
  - 5,040 kJ/m^2 (2000 hours at 0.70 W/m^2 irradiance) xenon-arc exposure

*Test specimen is 2.75" (69.85 mm by 140 mm) by 5.5" piece of membrane with edges sealed.

*Criterion – after 3 complete cycles, test specimens shall remain flexible and not have any cracking under 10x magnification while wrapped around a 3" (76.2 mm)-diameter mandrel.

Supplemental Approvals, Statements and Characteristics:

1. Sure-Weld TPO meets or exceeds the requirements of ASTM D6878 Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing.
2. Sure-Weld TPO membranes conform to requirements of the US E.P.A. Toxic Leachate Test (40 CFR part 136) performed by an independent analytical laboratory.
3. Sure-Weld TPO was tested for dynamic puncture resistance per ASTM D5635-04 using the most recently modified impact head. 45-mil (1.14 mm) was watertight after an impact energy of 12.5 J (9.2 ft-lbf) and 60-mil (1.52 mm) was watertight after 22.5 J (16.6 ft-lbf). 80-mil (2.03 mm) Extra was watertight after an impact energy of 30.0 J (22.1 ft-lbf).
4. All FM approved assemblies have been tested to pass FM 4470 for foot traffic resistance.

Optional APEEL™ Protective Film

Shield Carlisle's Sure-Weld TPO membrane from dirt and scuffs during installation with APEEL Protective Film. Factory-applied and easy to remove, APEEL eliminates the need for rooftop cleaning upon project completion.

- Ideal for re-roofing, re-cover, and new construction projects
- Simple and easy to remove
- Saves time and money when compared to pressure washing
- Protecting from dirt maintains maximum membrane reflectivity and long-term performance

Installation

Simply order membrane with APEEL, install, and remove the film to reveal a clean, new roof.

- APEEL Protective Film should be removed from within areas that are to be heat-welded together. In areas that do not require heat-welding, the APEEL Protective Film can be left in place for up to 90 days without degrading due to its excellent heat- and UV-resistance.
- When the installation of the entire TPO roofing system is complete, remove and discard the APEEL Protective Film.

CARLISLE SYNTEC SYSTEMS

Sure-Weld TPO
Reinforced Membrane

Typical Properties and Characteristics

Physical Property	ASTM D6878 Requirement	45-mil (1.14 mm)	60-mil (1.52 mm)	80-mil Extra (2.03 mm)
Tolerance on Nominal Thickness, % ASTM D751 test method	+15, -10	± 10	± 10	± 10
Thickness Over Scrim, in. (mm) ASTM D7635 optical method, average of 3 areas	0.015 min (0.380)	0.018 typical (0.457)	0.024 typical (0.610)	0.034 typical (0.864)
Breaking Strength, lbf (kN) ASTM D751 grab method	220 (976 N) min	225 (1.0) min 320 (1.4) typical	250 (1.1) min 360 (1.6) typical	350 (1.6) min 425 (1.9) typical
Elongation Break of Reinforcement, % ASTM D751 grab method	15 min	15 min 25 typical	15 min 25 typical	15 min 25 typical
Tearing Strength, lbf (N) ASTM D751 proc. B 8 in. x 8 in.	55 (245) min	55 (245) min 130 (578) typical	55 (245) min 130 (578) typical	55 (245) min 130 (578) typical
Brittleness Point, °F (°C) ASTM D2137	-40 (-40) max	-40 (-40) max -50 (-46) typical	-40 (-40) max -50 (-46) typical	-40 (-40) max -50 (-46) typical
Linear Dimensional Change, % ASTM D1204, 6 hours at 158°F	± 1 max	± 1 max -0.2 typical	± 1 max -0.2 typical	± 1 max -0.2 typical
Ozone Resistance, no cracks 7X ASTM D1149, 100 pphm, 168 hrs	PASS	PASS	PASS	PASS
UV Exposure (Xenon Arc), no cracks 7X ASTM G155, min. exposure 10,080 kJ/m² (4,000 hrs - 0.70 W/m²)	PASS	PASS	PASS	PASS
Water Absorption Resistance, mass % ASTM D471 top surface only 166 hours at 158°F water	± 3.0 max	± 3.0 max 0.90 typical	± 3.0 max 0.90 typical	± 3.0 max 0.90 typical
Factory Seam Strength, lbf (N) ASTM D751 grab method	66 (290) min	66 (290) min	66 (290) min	66 (290) min
Field Seam Strength, lbf/in (kN/m) ASTM D1876 tested in peel	No requirement	25 (4.4) min 50 (8.8) typical	25 (4.4) min 60 (10.5) typical	40 (7.0) min 70 (12.3) typical
Water Vapor Permeance, Perms ASTM E96 proc. B	No requirement	0.10 max 0.05 typical	0.10 max 0.05 typical	0.10 max 0.05 typical
Puncture Resistance, lbf (kN) FTM 101C, method 2031 (see supplemental section)	No requirement	250 (1.1) min 325 (1.4) typical	300 (1.3) min 350 (1.6) typical	400 (1.8) min 450 (2.0) typical
Properties After Heat Aging ASTM D573, 32 weeks @ 240°F or 8 weeks @ 275°F No cracking when bent around 3" diameter mandrel Weight Change, %	PASS No cracking ± 1.5 max	PASS No cracking 1.0 max	PASS No cracking 1.0 max	PASS No cracking 1.0 max
Typical Weights lb/ft² (kg/m²)		0.25 (1.22)	.33 (1.61)	.45 (2.20)
Air Permeance, ASTM E2178	No Requirement	PASS	PASS	PASS

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

Green Building Information

Pre-Consumer Recycled Content	10%
Post-Consumer Recycled Content	0%
Solar Reflectance Index (SRI)	White – 99 Tan – 86 Gray – 52
Global Warming Potential (GWP)	TPO 45 mils 2.90E+00 TPO 60 mils 3.77E+00 TPO 80 mils 5.28E+00
Volatile Organic Compounds (VOC) Content	N/A
Manufacturing Location(s)	Senatobia, MS Tooele, UT Carlisle, PA
Corporate Sustainability Report (CSR) Availability	Yes
Environmental Product Declaration (EPD) Availability	

Radiative Properties for Cool Roof Rating Council (CRRC) and LEED

	Test Method	White TPO	Tan TPO	Gray TPO
CRRC – Initial solar reflectance	ASTM C1549	0.79	0.71	0.46
CRRC – Solar reflectance after 3 years	ASTM C1549 (uncleaned)	0.70	0.64	0.43
CRRC – Initial thermal emittance	ASTM C1371	0.90	0.86	0.89
CRRC – Thermal emittance after 3 years	ASTM C1371 (uncleaned)	0.86	0.87	0.88
LEED – Thermal emittance	ASTM E408	0.90	0.86	0.85
SRI – Initial (Solar Reflectance Index)	ASTM E1980	99	86	52
SRI – 3 year aged (Solar Reflectance Index)		85	77	49

Radiative Properties (Initial) for Special Colors

	Reflectance	Emittance	SRI
Medium Bronze	0.12	0.89	8
Rock Brown	0.23	0.88	23
Slate Gray	0.20	0.89	18
Terra Cotta	0.25	0.88	24
Patina Green	0.25	0.88	25

Solar Reflectance Index (SRI) is calculated per ASTM E1980. The SRI is a measure of the roof's ability to reject solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. Materials with the highest SRI values are the coolest choices for roofing. Due to the way SRI is defined, particularly hot materials can even take slightly negative values and particularly cool materials can even exceed 100.

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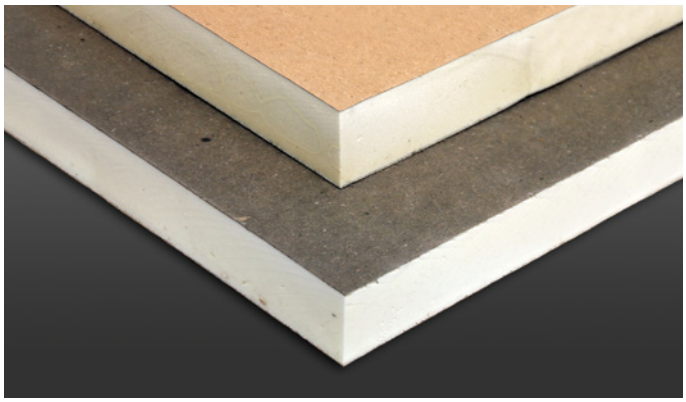
CARLISLE SYNTEC SYSTEMS

InsulBase® POLYISO Insulation



Overview

InsulBase is a rigid-roof insulation panel composed of a closed-cell polyisocyanurate foam core bonded on each side to glass-reinforced felt (GRF). ReadyFlash® Technology is a standard feature of InsulBase Polyiso that allows the contractor to manipulate flash-off times by choosing which side of the insulation board to apply membrane adhesives. ReadyFlash features a dark glass-reinforced felt (GRF) on one side of the insulation board and a light glass-reinforced felt on the other.

ReadyFlash TECHNOLOGY

- Increases surface temperature of the dark facer up to 25ºF above ambient temperature and provides up to 30% faster adhesive flash-off.
- Decreases surface temperature of the light facer up to 5ºF below ambient temperature.

Features and Benefits

- InsulBase polyiso insulation provides the highest R-value per inch of commercially available insulation products
- Zero ozone-depleting components, HFC- and HCFC-free formulation
- Approved for direct application to steel decks

Panel Characteristics

- Available in 4' x 4' (1220 mm x 1220 mm) and 4' x 8' (1220 mm x 2440 mm) panels in thickness of ½" (13 mm) to 4.5" (115 mm)
- Available in 4' x 12' (1220 mm x 3660 mm) panels in the following thickness: 1.5", 1.75", 2.0", 2.2", 2.5", 2.6", 3.0", 3.3", and 3.5"

Applications

- Single-Ply Roof Systems (Ballasted, Mechanically Attached, Fully Adhered)

Sustainable Attributes

Carlisle SynTec Systems' focus has always been innovation – Innovation to solve problems, improve performance, reduce labor, and above all, improve sustainability. Carlisle is committed to driving sustainable and efficient processes in the design and manufacturing of our products.

- Zero ozone-depleting components, HFC- and HCFC-free formulation
- CDPH Compliant for maximum allowable concentrations of target VOCs
- Up to 56.9% recycled content by weight (36.6% post-consumer/20.3% pre-consumer)
- Contributes to LEED® and Green Globes certification requirements
- End-of-life jobsite disposal options available for re-use/re-purposing
- Carlisle Polyiso Roof Insulation and HD Cover Board EPDs available
- PIMA Quality Mark℠ Certification Program participant for Long-Term Thermal R-values (LTTR)
- Highest R-value per inch providing maximum energy savings and CO_2 emissions avoidance

Polyiso Eco Ready (Optional)

- 5% bio-content option available (for 2.0" and 2.6" thicknesses)
- Contributes to carbon reduction initiatives via mass balance approach under ISCC PLUS compliance

Installation

Ballasted Single-Ply Systems

Each InsulBase panel is loosely laid on the roof deck. Butt edges and stagger joints of adjacent panels. Install the roof membrane according to Carlisle's specifications.

Mechanically Attached Single-Ply Systems

InsulBase panels must be secured to the roof deck with fasteners and plates (appropriate to the deck type). Butt edges and stagger joints of adjacent panels. Install the roof membrane according to Carlisle's specifications.

Fully Adhered Single-Ply Systems

InsulBase panels must be secured to the roof deck with fasteners and plates (appropriate to deck type). Butt edges and stagger joints of adjacent panels. Install the roof membrane according to Carlisle's specifications.

InsulBase 4' x 8' and 4' x 12' panels can be secured to the roof deck with Carlisle's Flexible FAST® Adhesive, either full coverage or bead spacing.

InsulBase 4' x 4' panels may be adhered to prepared concrete deck with a full mopping of Type III or IV asphalt.

Review Carlisle specifications and details for complete installation information.

CARLISLE SYNTEC SYSTEMS

InsulBase POLYISO Insulation

Codes and Compliances

- ASTM C1289, Type II, Class 1, Grade 2 (20 psi), Grade 3 (25 psi)
- International Building Code (IBC) Section 2603
- UL Standard 790, 263 and 1256: Component of Class A Roof Systems (refer to UL Roof Materials' system directory)
- FM® Standards 4450/4470: Class 1 approval for steel roof-deck constructions (refer to FM RoofNav℠)
- California Code of Regulations, Title 24, Insulation Quality Standard License #TI-1418
- Third-party certification with the PIMA Quality Mark for Long-Term Thermal Resistance (LTTR) values
- CAN/ULC S704, Type 2, Class 3 (20PSI), Type 3, Class 3 (25PSI)
- Florida Building Code Approval
- CDPH compliant for maximum allowable concentrations of target VOCs

Precautions

Insulation must be protected from open flame and kept dry at all times. Install only as much insulation as can be covered the same day by completed roof-covering material. Protect installed product from excessive foot traffic. Carlisle will not be responsible for specific building and roof design by others, for deficiencies in construction or workmanship, for dangerous conditions on the jobsite or for improper storage and handling. Technical specifications shown in this literature are intended to be used as general guidelines only and are subject to change without notice. Call Carlisle for more specific details, or refer to PIMA Technical Bulletin No. 109: Storage & Handling Recommendations for Polyiso Roof Insulation.

Typical Properties and Characteristics (ASTM C1289)

Physical Property	Test Method	Value
Compressive Strength	ASTM D1621	20 psi* minimum (138 kPa, Grade 2)
Dimensional Stability	ASTM D2126	2% linear change (7 days)
Moisture Vapor Permeance	ASTM E96	<1 perm (57.5 ng/(Pa•s•m^2))
Water Absorption	C1763	<1% volume

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

*Also available in 25 psi minimum, Grade 3

InsulBase Polyiso Thermal Values

Thickness (inches)	LTTR R-value	Thickness (inches)	LTTR R-value
0.5	2.8	2.75	15.9
0.75	4.2	2.8	16.2
1	5.7	2.9	16.8
1.1	6.3	*3.0	17.4
1.2	6.8	3.1	18.0
1.25	7.1	3.2	18.6
1.3	7.4	3.25	18.9
1.4	8.0	*3.3	19.2
*1.5	8.6	3.4	19.9
1.6	9.1	*3.5	20.5
1.7	9.7	3.6	21.1
*1.75	10.0	3.7	21.7
1.8	10.3	3.75	22.0
1.9	10.8	3.8	22.3
*2	11.4	3.9	23.0
2.1	12.0	4	23.6
*2.2	12.6	4.1	24.2
2.25	12.9	4.2	24.9
2.3	13.2	4.25	25.2
2.4	13.8	4.3	25.5
*2.5	14.4	4.4	26.1
*2.6	15.0	4.5	26.8
2.7	15.6		

Flute Spanability is 5 ¼" for 1.9" or thinner. Flute Spanability is 7 ½" for 2" or thicker.
*4' x 12' offering is available in this thickness.

CLASSIFIED C UL US

Foamed plastic as roof deck construction material with resistance to an internal fire exposure only for use in construction no.(s) 120 and 123. See UL Directory of Products Certified for Canada and UL Roofing Materials and Systems Directory. 99DL.

ISCC International Sustainability & Carbon Certification

U.S. GREEN BUILDING COUNCIL

PIMA QualityMark℠ Independent / Certified / LTTR +

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REPRINT CODE: 600491 INS_CST-2129 - "InsulBase Polyiso Product Data Sheet"

US PATENT NUMBER: 10,662,652

CARLISLE SYNTEC SYSTEMS

VapAir Seal™ 725TR

Air and Vapor Barrier/Temporary Roof

Overview

Carlisle's VapAir Seal 725TR Air and Vapor Barrier/Temporary Roof is a 40-mil composite consisting of 35 mils of self-adhering rubberized asphalt laminated to a 5-mil woven polypropylene film. A one-piece silicone poly release liner is applied to the SBS adhesive to prevent the material from bonding to itself. VapAir Seal 725TR is available in a 325-square-foot roll with dimensions of 39" x 100'. The factory-controlled thickness of the membrane ensures uniform barrier properties on the job; the woven polypropylene film increases strength and has a non-skid surface suitable for the bonding of subsequent layers. Approved Carlisle adhesives for attaching insulation to VapAir Seal 725TR are:

- Flexible FAST™ Adhesive
- OlyBond 500™

VapAir Seal 725TR can be used on concrete, plywood, exterior gypsum, DensDeck® Prime, SECUROCK® or other approved substrates in conjunction with Carlisle SynTec roofing systems. Gypsum decks may require additional securement with mechanical fasteners. Use of CAV-GRIP™ III Low-VOC Adhesive/Primer, CCW-702 or CCW-702LV is required on all substrates. VapAir Seal 725TR may be installed directly over a nailed Carlisle Modified Base Sheet when primed with CAV-GRIP III.

VapAir Seal 725TR must be covered with roofing membrane within 180 days. T-joints must be sealed with an internal bead of Carlisle Lap Sealant. Carlisle does not accept responsibility for the watertight integrity of the VapAir Seal 725TR related to workmanship issues or physical damage.

For unusual situations, contact the Project Review and Warranty Services Department prior to specifying this material.

Installation

Surface Preparation: The concrete surface shall be completely dry; dryness shall be determined by a qualified owner's representative. The surface shall have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, laitance and form-release agents. Some curing compounds may interfere with proper adhesion, so an adhesion test is recommended. In the event of rain, concrete must be allowed to dry before the application of primer. **Artificial drying methods such as torches are not acceptable.**

Adhesive: Surfaces to receive VapAir Seal 725TR must be clean and dry. Use of CAV-GRIP III, CCW-702 or CCW-702LV is required on all substrates. Approved Carlisle adhesives for attaching insulation to VapAir Seal 725TR are: Flexible FAST Adhesive and OlyBond 500.

Application: VapAir Seal 725TR material must be stored and kept above 60°F prior to installation. Apply VapAir Seal 725TR from low to high points in a shingle fashion so that the laps will shed water. Overlap all edges by at least 2". End laps should be staggered. Position the membrane carefully to avoid fish-mouths and wrinkles. **Roll the VapAir Seal 725TR membrane immediately after installation with a 100–150-pound roller wrapped in a resilient material.** When the VapAir Seal 725TR is applied to a vertical surface, hand-rolling with a 2" or 4" hand roller is required. Vertical surfaces must be prepared in the same fashion as horizontal surfaces.

Note: For applications below 40°F – all materials must be kept above 60°F prior to installation and CAV-GRIP III Primer must be used.

Seaming: Apply a 2"-long bead of lap sealant internally along any T-joints or step-offs. Use a hand roller or stand-up seam roller to mate the entire seam together, ensuring the seam's leading edge is rolled properly. Be sure to pay particular attention to the T-joints and step-offs. If seam surface is contaminated, clean and prime with CCW-702, CCW-702LV, or CAV-GRIP III.

Review Carlisle specifications and details for complete installation information.

CARLISLE SYNTEC SYSTEMS

VapAir Seal 725TR

Air and Vapor Barrier/Temporary Roof

Precautions

- Use proper stacking procedures to ensure sufficient stability of the materials.
- Exercise caution when walking on wet membrane. Membranes are slippery when wet.
- VapAir Seal 725TR must be clean and dry prior to installation of subsequent layers.
- VapAir Seal 725TR should be installed using CAV-GRIP III adhesive when temperatures are below 40°F.
- VapAir Seal 725TR membrane and primers must be stored above 60°F prior to installation.
- Avoid moving or stacking heavy loads on the installed membrane, particularly in hot weather. This could thin out the self-adhering barrier layer.
- Refer to applicable Safety Data Sheets before using any Carlisle products.
- Do not apply CAV-GRIP III, CCW-702 or membrane to damp or contaminated surfaces.
- Do not apply CAV-GRIP III, CCW-702 or membrane to frozen substrates.
- Primers must be allowed to completely flash off. Refer to the primer PDS for flash-off times.
- 725TR may be used as a temporary roof up to 180 days.

Typical Properties and Characteristics

Physical Property	Test Method	Typical
Thickness	ASTM D1970	40 mils
Tensile Strength	ASTM D412	250 psi
Elongation	ASTM D412	250%
Peel Adhesion	ASTM D903	5 lbs/in
Puncture Resistance	ASTM E154	60 lbs
Permeability	ASTM D1970*	0.015 perms
Air Permeance	ASTM E2178	0.000 L*m^2 @ 75 Pa
Shelf Life	N/A	1 year

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

*D1970 is tested to E96 standards for permeability.

LEED® Information

Pre-consumer Recycled Content	0%
Post-consumer Recycled Content	0%
Manufacturing Location	Terrell, TX
VOC Content	0 g/L
Solar Reflectance Index	N/A

Packaging

Product	725TR Air & Vapor Barrier/Temporary Roof
Size/Weight	39" x 100' / 89 lbs
Actual Coverage Rate	305 ft^2
Part Number	330170

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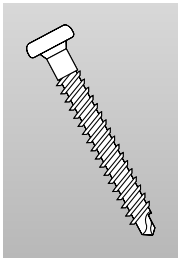
CARLISLE SYNTEC SYSTEMS

Fasteners & Plates

- Sure-Seal®, Sure-White®, and Sure-Tough™ EPDM
- Sure-Weld® TPO
- Sure-Flex™ PVC

Carlisle SynTec Systems offers an array of fasteners and plates to complement our roofing systems. From pre-assembled choices for EPDM installations to Purlin fasteners for Metal Retrofit Systems and Piranha plates for Sure-Weld options, our mission continues to be to provide all components necessary for the application of a long-lasting and secure single-ply roofing system from Carlisle.

HP Fastener

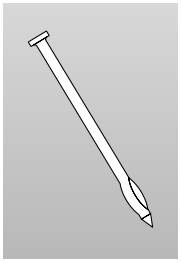


Applicable to steel, 22-gauge and heavier, CDX plywood and wood plank deck types. Can be used to secure Sure-Tough membranes, RUSS and insulation. Longer fastener sizes available as special order.

Sizes Available:
1¼", 2" – 15" (1" Increments)

Size & Quantity Per Box:
2" – 6": 1,000; 7" – 12": 500; 13" – 15": 250 1¼":1000

CD-10

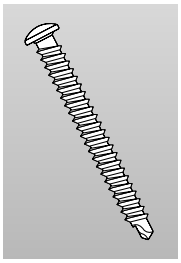


Applicable for concrete decks. Used to secure Sure-Seal, Sure-Weld and Sure-Flex membranes and for insulation securement.

Sizes Available:
2" – 6" (½" Increments)
7" – 12" (1" Increments)

Size & Quantity Per Box:
2" – 8": 500; 9" – 12": 250

HP-X Fastener™ & HP-XTRA Fastener



A #15 diameter fastener applicable to steel, wood and CDX plywood. Can be used to secure Sure-Seal, Sure-Weld and Sure-Flex membranes.

Sizes Available:
2" – 8" (1" Increments)
10" – 16" (2" Increments)

Size & Quantity Per Box:
2" – 4": 1,000; 5" – 12": 500; 14" – 16": 250

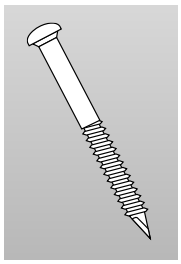
HP-XTRA FASTENER

Also Available (Not shown)
A #21 diameter fastener applicable to steel, wood and CDX plywood decks.

Sizes Available:
2" – 8" (1" increments)

Size & Quantity Per Box:
500 (2" – 6"), 250 (7" – 8")

InsulFast™

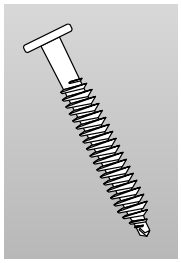


A #12 diameter fastener applicable to wood decks and steel, 22-gauge and heavier, decks. Used only for insulation attachment.

Sizes Available:
2" – 8" (1" Increments)
1⅝", 2¼", 3" – 8" (1" Increments)

Size & Quantity Per Box:
2" – 8": 1,000

Sure-Tite®

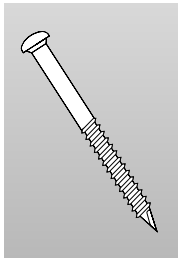


A 0.33" diameter fastener applicable to steel, 22-gauge and heavier. Can be used for Sure-Tough membrane securement in mechanically attached systems.

Sizes Available:
2" – 8" (1" Increments)

Size & Quantity Per Box:
2", 3": 500; 4" – 8": 250

HD 14-10

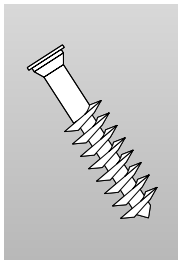


A #14 diameter fastener used for Sure-Tough, Sure-Weld and Sure-Flex membrane securement into wood and concrete decks. Also applicable to insulation securement into steel, wood and concrete decks.

Sizes Available:
2" – 12" (1" Increments)
14" – 24" (2" Increments)

Size & Quantity Per Box:
2" – 4": 1,000; 5" – 11": 500; 12" – 24": 250

Gyptec Fastener & Plate



Applicable to cementitious wood fiber and gypsum decks. Can be used to secure Sure-Tough, Sure-Weld and Sure-Flex membranes and insulation.

Sizes Available:
2½" – 10" (½" Increments)

Size & Quantity Per Box:
2½" – 7": 500; 7½" – 10": 250

GYPTEC PLATE

Sizes Available:
2" Metal membrane plate
3" Metal insulation plate

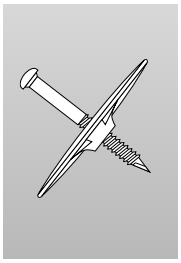
Quantity Per Box: 1,000

CARLISLE SYNTEC SYSTEMS

Fasteners & Plates

- Sure-Seal®, Sure-White®, and Sure-Tough™ EPDM
- Sure-Weld® TPO
- Sure-Flex™ PVC

ASAP with Polymer Plate

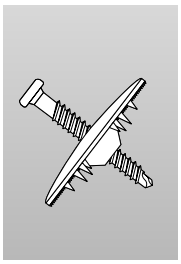


A pre-assembled #12 diameter fastener and plastic insulation plate applicable to steel and wood decks. Used to secure insulation only. Longer fastener sizes available as special order.

Sizes Available:
2¼", 3" – 12" (1" Increments)

Size & Quantity Per Box:
2¼" – 8": 250; 9" – 12": 200

HP Pre-Assembled

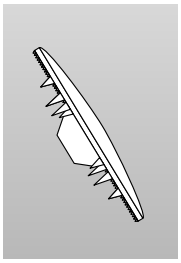


Pre-assembled HP Fastener and Polymer seam plate applicable to steel, wood and CDX plywood decks. Used to secure Sure-Tough membranes.

Sizes Available:
2¼", 3" – 12" (1" Increments)

Size & Quantity Per Box:
2¼", 3", 3¼", 3¾": 450; 4", 5": 400; 6": 350; 7", 8": 300; 9": 250; 10" – 12": 200

HP Polymer Seam Plate



Along with the HP Fastener, used to mechanically fasten reinforced Sure-Tough membrane and RUSS over steel decks.

Sizes Available:
2" diameter

Quantity Per Box: 1,000

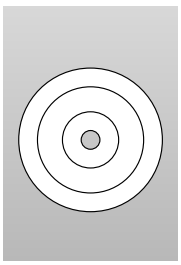
HP-XTRA Polymer Seam Plate

Also Available (Not shown)
For use with HP-XTRA Fastener to secure Sure-Tough membranes to steel decks.

Sizes Available:
2⅜" diameter

Quantity Per Box: 1,000

Seam Fastening Plate

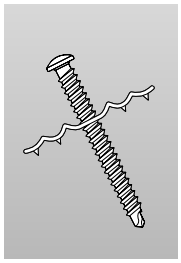


Applicable with HP, HD 14-10 and CD-10 fasteners to mechanically attach reinforced Sure-Tough membrane (excluding steel decks) and RUSS (except when used with mechanically fastened EPDM to steel decks).

Sizes Available:
2" diameter

Quantity Per Box: 1,000

HP-X ASAP

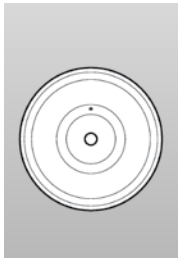


A pre-assembled HP-X Fastener and Piranha Plate™ applicable to steel, wood and CDX plywood decks. Used to secure Sure-Weld and Sure-Flex membranes.

Sizes Available:
2" – 10" (1" Increments)
12" – 16" (2" Increments)

Size & Quantity Per Box:
2" – 9": 250; 10" – 12": 200; 14" – 16": 150

RhinoBond® Plate

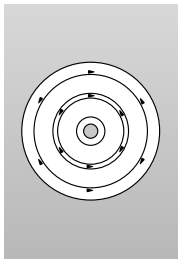


3"-round, specially coated plates used with HP-X Fasteners and the RhinoBond induction welding system. Available in TPO and PVC versions.

Sizes Available:
3" diameter

Quantity Per Box: 500/carton

PIRANHA™ Plate



Along with the appropriate fastener, used to secure Sure-Weld and Sure-Flex membranes to steel, concrete and wood decks.

Sizes Available:
2⅜" diameter

Quantity Per Box: 1,000

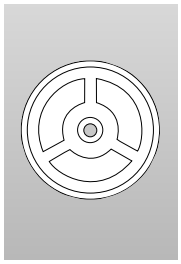
HP-XTRA PIRANHA Plate

Also Available (Not shown)
For use with HP-XTRA Fastener to secure Sure-Weld and Sure-Flex membranes to steel and wood decks.

Sizes Available:
2⅜" diameter

Quantity Per Box: 1,000

Insulation Fastening Plate



Applicable with InsulFast, HP, CD-10 and HD 14-10 fasteners. Used for insulation securement only on steel, wood and concrete decks.

Sizes Available:
3" diameter

Quantity Per Box: 1,000

800-479-6832 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7053 | **www.carlislesyntec.com**

Advancement of Construction Technology

SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: Newberry County Gallman Place Roof Improvements
Newberry, SC

To: Ms. Laurel Getty
DP3 Architects

Re: Substitution Request for Thermoplastic Polyolefin (TPO) Membrane Roofing

Substitution Request Number: 1

From: David Hartis

Date: 4/13/2026

A/E Project Number: 23234-A

Contract For: Division 7 Materials

Specification Title: Division 7

Description: Thermoplastic Polyolefin (TPO) Roofing

Section: 075423 Page: 4

Article/Paragraph: 2.01

Proposed Substitution: Everguard 60 Mil Fully Adhered TPO Roof System

Manufacturer: GAF Corp. Address: Parsippany, NJ Phone: 800-766-3411

Trade Name: Everguard 60 TPO Membrane Model No.:

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: David Hartis
Signed by: David Hartis
Firm: RSG Building Solutions (a QXO Company)
Address: 9333-F Forsyth Park Drive
Charlotte, NC 28273
Telephone: 704-724-8512

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings X☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐_____

GAF

MEMBRANE

60 MIL

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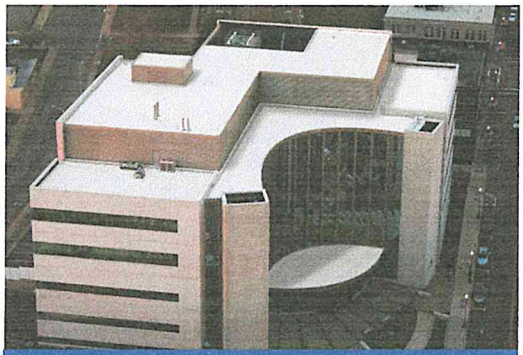
SINGLE-PLY ROOFING SYSTEMS



Fall River Courthouse, Fall River, Massachusetts

Why TPO

- Great Value—Superior performance at a cost-effective price
- Excellent Seam Strength—Heat-welded seams provide greater seam strength to taped and other seams
- Long-term Weathering—Excellent long-term heat and UV resistance
- Energy Saving—Highly reflective and emissive white roof can help reduce energy costs and urban heat island effect
- CREST Energy Savings Calculator—See your potential savings at cool.gaf.com
- Versatile Application Method

Why GAF EverGuard® TPO

- Outperforms standard TPO in heat aging and UV tests—the best predictors of TPO performance
  - After accelerated heat aging at 275°F (135°C) for 105 days, EverGuard® TPO showed no cracking—while every one of the competitors' samples had failed! **See below:**

  - UV testing—Greater than 2.5 times the industry standard (ASTM D6878 weather resistance test)
- Guarantees are available up to 25 years when using EverGuard® TPO 60 mil Membrane.*
- Easier to install due to:
  - Large welding window
  - Most complete line of accessories
  - 10' (3.05 m) wide sheets

Installation

EverGuard® TPO 60 mil Membrane is suitable for all types of single-ply systems:

- Mechanically Attached Application...for a quick and cost-effective system that can be installed practically year-round.
- RhinoBond® Application...can be applied without using adhesives and installed practically year round. Qualifies for the same guarantee length as an adhered system.*
- Adhered Application...can be installed with EverGuard® 1121 Solvent-Based Adhesive, EverGuard® Low VOC Adhesive, or EverGuard® WB181 Water-Based Adhesive for the smoothest appearance. Provides superior wind uplift performance.

Accessories

Field fabrication of TPO accessories is time-consuming, costly, inconsistent, and can lead to unreliable details that compromise a watertight roofing system. EverGuard® TPO prefabricated accessories deliver consistent quality and eliminate the worry and problems often associated with field fabrication. They can also boost productivity up to 200%,** while reducing installed cost by up to 12%.

*See applicable guarantee for complete coverage and restrictions.

**Based on GAF estimate to field-fabricate flashing details.

U.S. only

California Title 24 Compliant

FM APPROVED

CLASSIFIED UL

MIAMI-DADE COUNTY APPROVED

TPO membranes meet the performance requirements of ICC ER-6030

EverGuard® TPO 60 mil Membrane

Applicable Standards

UL Listed, FM Approved, Miami-Dade County Product Control Approved, State of Florida Approved, CRRC Rated, Title 24 Compliant*, ENERGY STAR® Certified**, ASTM D6878.

Physical Properties	ASTM Test Method	ASTM D6878 Minimum	EverGuard® Typical Test Data
1. Certain data is provided in MD (machine direction) x CMD (cross machine direction) format. 2. Data is based upon typical product performance, and is subject to normal manufacturing tolerance and variance.			
Nominal Thickness	ASTM D751	0.039" (min.) (0.99 mm)	0.060" (1.52 mm)
Breaking Strength	ASTM D751 Grab Method	220 lbf/in. (38.5 kn/m)	305 lbf x 290 lbf (454 x 432 kg/m)
Factory Seam Strength	ASTM D751	66 lbf (98.34 kg/m)	135 lbf (membrane failure) (201.1 kg/m)
Elongation at Break	ASTM D751	15%	30%
Heat Aging	ASTM D573	90% Retention of Breaking Strength and Elongation at Break	100%
Tear Strength	ASTM D751 8" x 8" (203 x 203 mm) Sample	55 lbf (81.95 kg/m)	75 lbf x 130 lbf (111.8 x 193.7 kg/m)
Puncture Resistance	FTM 101C Method 2031	Not Established	380 lb. (172 kg)
Cold Brittleness	ASTM D2137	-40°C	-40°C
Permeance	ASTM E96	Not Established	0.08 Perms
Dimensional Change	ASTM D1204 @158°F (70°C), 6 hrs.	+/-1%	0.4%
Water Absorption	ASTM D471 @158°F (70°C), 1 week	+/-3.0% (top coating only)	0.7%
Hydrostatic Resistance	ASTM D751 Method D	Not Established	430 psi
Ozone Resistance	ASTM D1149	No visible deterioration @ 7 x magnification	No visible deterioration @ 7 x magnification
SRI (Solar Reflectance Index) Initial/Aged	N/A	N/A	94/81 83 Aged Title 24
Reflectivity (white) Initial/Aged	ASTM C1549 ASTM E903	N/A N/A	0.76/0.68 81.9% Reflectance
Emissivity (white) Initial/Aged	ASTM C1371 ASTM E403	N/A N/A	0.90/0.83 0.94
Weather Resistance	ASTM G155/D6878	10,080 KJ/(m² · nm) at 340 nm	>25,000 KJ/(m² · nm) at 340 nm
Heat Aging	ASTM D573	240°F (115°C) for 32 weeks	60 weeks
Thickness Above Scrim	ASTM D7635	Min 30% of Total Thickness	22.1 mil (Nominal)
Guarantee			
Up to 25 years			

*White, Energy Gray, and Energy Tan Membranes Only

**ENERGY STAR® only valid in the U.S.

Product Data

Roll Size	Note: Product sizes, dimensions, and widths are nominal values and are subject to normal manufacturing/packaging tolerance and variation.				
	Colors	**Full Size Roll**	**Full Roll Weight**	**Half Roll Size**	**Half Roll Weight**
	White, Tan, Gray, Energy Tan, Energy Gray	10' x 100' (3.05 x 30.5 m) (1,000 sq. ft. [92.9 sq.m])	322 lb. (146 kg)	5' x 100' (1.52 x 30.5 m) (500 sq. ft. [46.5 sq.m])	162 lb. (73.5 kg)
		8' x 100' (2.44 x 30.5 m) (800 sq. ft. [74.3 sq.m])	257 lb. (117 kg)	4' x 100' (1.21 x 30.5 m) (400 sq. ft. [37.1 sq.m])	128.8 lb. (58.4 kg)
	Note: Membrane rolls shipped horizontally on pallets, stacked pyramid-style and banded.				
Storage	Store rolls on their sides on pallets or shelving in a dry area.				
Safety Warning	Membrane rolls are heavy. Position and install by at least two people.				

RhinoBond® is a registered trademark of OMG.

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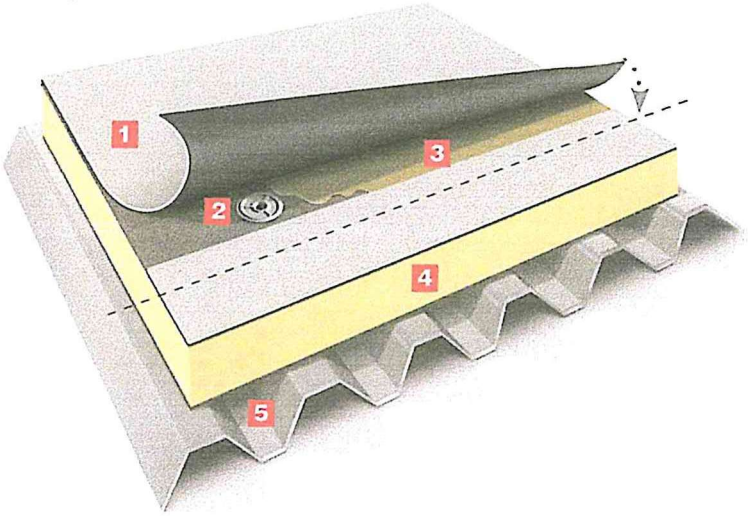
EverGuard® TPO
SINGLE-PLY ROOFING SYSTEMS

ADHERED Membrane Application



ADHERED MEMBRANE TYPICAL APPLICATION

1. EverGuard® TPO Reinforced Membrane
2. GAF Drill-Tec™ Insulation Fasteners and Plates
3. EverGuard® Approved Bonding Adhesive
4. EnergyGuard™ Insulation
5. Approved Roof Deck

SYSTEM FEATURES AND BENEFITS INCLUDE...

- Wider TPO membranes
- Heat-weldable seams
- High wind uplift performance
- Thick top-ply for enhanced weathering and durability
- EverGuard® membranes are ENERGY STAR® qualified (U.S. only) and rated by CRRC
- Complete line-up of EverGuard® TPO accessories

	NEW CONSTRUCTION						REROOFING		
Existing or New Deck Type	Steel	Plywood or OSB	Lt. Wt. Concrete	Structural Concrete	Wood Planks	Cementitious Wood Fiber	Smooth Surface BUR	Gravel-Surfaced BUR	Existing Single-Ply
Insulation Required	YES	NO	YES	NO	YES	YES	YES	YES	YES
Recommended Insulations	GAF EnergyGuard™ Polyiso, EnergyGuard™ HD Polyiso, EnergyGuard™ HD Plus, High Density Fiber Board, HD Fiber Board over Polystyrene, DensDeck® Prime, SECUROCK®						Refer To New Construction		
Insulation Attached By	GAF 2-Part Roofing Adhesive, GAF LRF Adhesive M, OlyBond500® Adhesive, or approved GAF Drill-Tec™ Fasteners and Plates						Refer To New Construction		
Membrane Attached By	EverGuard® 1121 Bonding Adhesive, EverGuard® Low VOC TPO Bonding Adhesive, EverGuard® WB181 Bonding Adhesive						Refer To New Construction		

For tear-off options, refer to "New Construction" above.
For current code approvals and guarantees, visit gaf.com.

U.S. only

California Title 24 Compliant

TPO membranes meet the performance requirements of ICC ER-6030

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EverGuard® TPO
SINGLE-PLY ROOFING SYSTEMS

Installation
- The GAF EverGuard® TPO Adhered Roofing System utilizes membranes in standard 45, 60, or 80 mil thicknesses.
- Insulation, where required, is secured to an acceptable roof deck.
- EverGuard® TPO membrane sheets are adhered to the insulation or substrate with GAF EverGuard® 1121 Bonding Adhesive, EverGuard® Low VOC TPO Bonding Adhesive, or water-based EverGuard® WB181 Bonding Adhesive.
- Adjoining sheets are overlapped and joined together with a minimum 1½" (38.1 mm) wide weld.

The above information represents a typical GAF EverGuard® TPO Adhered Roofing System. Refer to GAF published application and specifications manual for complete information.

EverGuard® Membrane Strengths
- Available in-stock colors: White, Gray, and Tan.
- Available preformulated colors: Energy Gray, Energy Tan, and 14 others.
- Custom colors also available.
- EverGuard® TPO reflectivity values exceed industry standards and the membrane meets the criteria for the ENERGY STAR® Program (U.S. only).
- Membranes are environmentally friendly; they have no chlorine or other harmful bi-products and contain post-industrial recycled materials.
- 45, 60 & 80 mil thicknesses.
- 4' (1.21 m), 5' (1.52 m), 8' (2.44 m) & 10' (3.05 m) widths.
- 50' (15.24 m) & 100' (30.5 m) lengths standard.
- EverGuard® TPO's top-ply surface is thicker and smoother than most other membranes on the market, providing long-term weatherability, excellent welding results, and reduced contaminant pick-up.
- EverGuard® TPO exceeds ASTM D6878 standards.

System Codes
- UL Class A & B slope ratings are available over any roof deck type.
- FM uplift values up to 120 psf are available.

For code specifics, refer to the GAF codes section in the applicable EverGuard® application and specifications manual.

Quality Assurance
GAF factory-certified roofing contractors are fully trained to install EverGuard® TPO roofing products and systems.

Inspection
Prior to the issuance of a system guarantee (if purchased), an inspection will be conducted by a GAF representative to ensure proper installation.

Guarantees/Warranties*
This system, properly installed and inspected on a commercial property, may be eligible to receive:
- Guarantees with 60 mil, up to 25 years; with 80 mil, up to 30 years.
- Higher wind-speed warranties upon review and acceptance by GAF.
- A 10-year *EverGuard® TPO Reflectivity Limited Warranty* (based on ENERGY STAR® criteria; U.S. only) on white membranes only.
- Impact-resistance warranties upon request and project review.

Ask about the GAF *WellRoof® Guarantee Extension*... a free 25% extension on your *Diamond Pledge™ NDL Roof Guarantee.***

*Consult with your certified applicator or GAF Representative for guarantee/warranty charges. See applicable guarantee/warranty for complete coverage and restrictions.
**See the *WellRoof® Guarantee Extension* for complete coverage and restrictions.

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EVERGUARD® TPO
SINGLE-PLY ROOFING SYSTEMS

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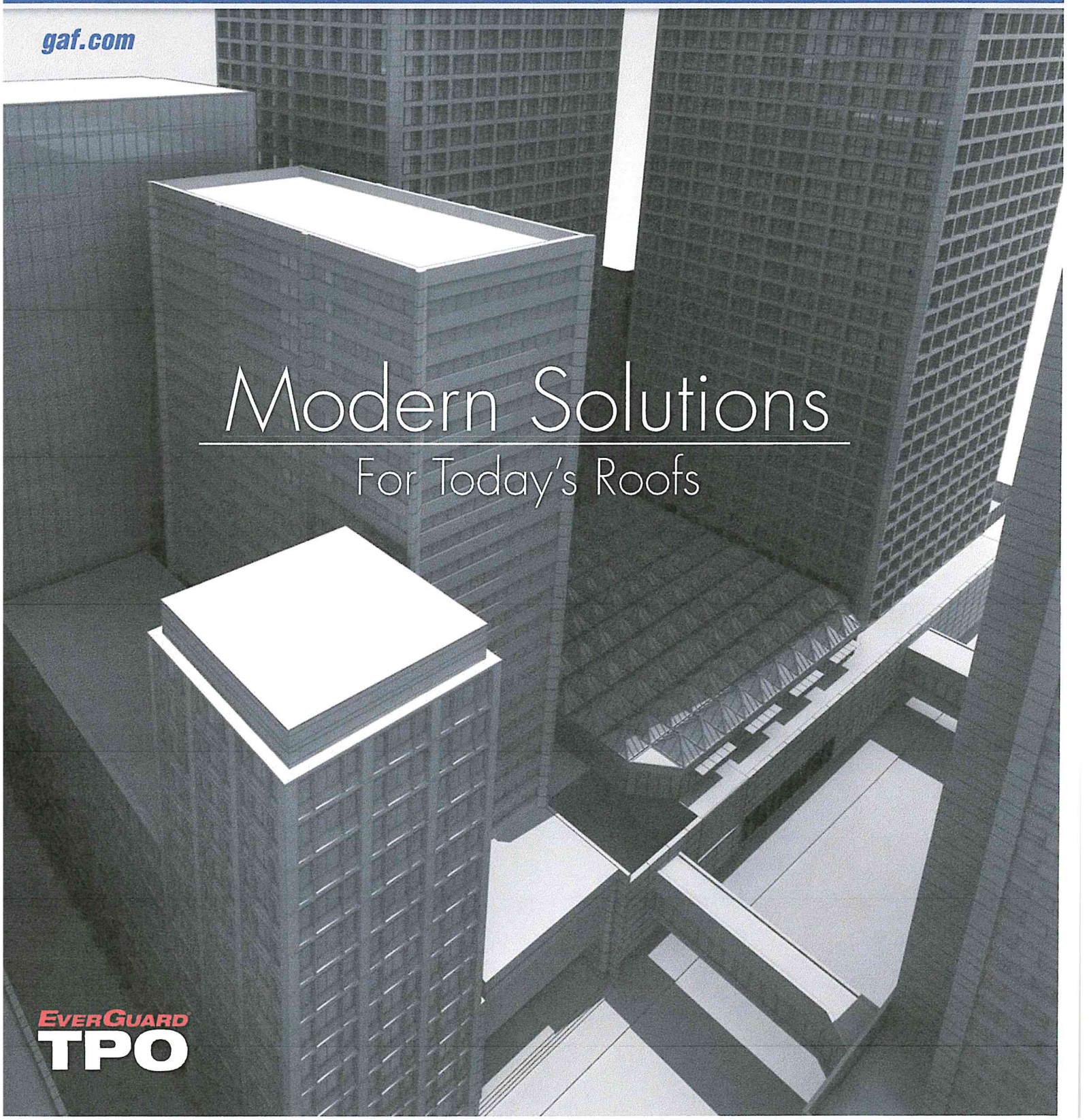


Modern Solutions
For Today's Roofs

EverGuard TPO

EVERGUARD® TPO
Single-Ply Roofing Systems

WHY TPO

In the 20+ years that TPO has been in the field, it's become one the most popular products used for low-slope roofing. Over 1 billion sq. ft. are installed annually, making up over 50% of single-ply roofs being installed today.

The rapid rise in popularity can be associated with several of TPO's inherent benefits, including:

- **Great Value...**
  Excellent performance at a cost-effective price.
- **Excellent Seam Strength...**
  Heat-welded seams provide greater seam strength to taped and other seams.
- **Long-term Weathering...**
  Excellent long-term heat and UV resistance.
- **Energy Saving...**
  Highly reflective and emissive white surface can help reduce energy costs and urban heat island effect.
  - » Check out your potential energy savings by going with a white roof at **cool.gaf.com**.
- **Inherently Flexible...**
  No need for plasticizers.
- **Naturally Fungal Resistant...**
  Doesn't require biocides.
- **Versatile Application Methods...**
  Including high-performance roofs requiring high wind uplift, increased puncture resistance, or quick economical systems.

WHY GAF

- Over 130 years in business and North America's largest roofing manufacturer.
- Offers a full line of roofing solutions, including TPO and PVC single-ply systems.
- Capital investments of over $130 million from 2011–2016 in commercial roof manufacturing, giving GAF the most state-of-the-art equipment in the industry.
- Only GAF offers the patent-pending EverGuard Extreme® membrane with the longest warranty in the industry (up to a 35-year guarantee*).
- Leader in sustainability, including having EPDs, HPDs, and being on the red list free listings.
- Commissioned the largest independent study ever conducted on TPO performance among North American manufacturers.
  - » Results show GAF has the best-performing TPO membranes in accelerated aging tests (visit TPOResults.com to learn more).

*See applicable guarantee for complete coverage and restrictions.

For the full data and testing results from our independent TPO study, visit **TPOResults.com.**

TPO RESULTS

The increasing popularity of TPO roofing systems has led to much confusion, exaggerated claims, and misinformation about TPO as a product class. As North America's largest roofing manufacturer, GAF decided to find out the truth about TPO performance.

GAF engaged Structural Research Inc. (SRI), a well-known and highly respected laboratory that has done testing with UL, NRCA, and MRCA to perform the largest independent performance study ever conducted of the 4 major U.S. TPO brands.

SRI procured all of the materials independently, testing over 400 samples that were subjected to over 6,000 individual measurements over the course of the study.

The testing methods included a variety of ASTM physical property tests, including thickness above the scrim and weld strength, which showed that the 4 TPO brands exhibit relatively similar performance on these parameters.

The study also tested accelerated weathering and UV resistance, the key properties that determine membrane performance and longevity. In these critical tests, GAF EverGuard Extreme® TPO proved to be in a performance class by itself, delivering next-generation performance against heat aging and UV degradation using the industry-recognized ASTM D573 accelerated weathering test at 275°F.

Among the standard TPO membranes, GAF EverGuard® TPO was the best-performing standard membrane out of all of the major brands.

Visit **TPOResults.com** for the full data and testing results among the major brands, as well as industry presentations and recommendations on how to specify EverGuard® TPO and EverGuard Extreme® TPO.

FULL LINE OF TPO MEMBRANES

EverGuard® TPO...

Was the best-performing standard TPO in accelerated aging in the largest independent TPO study ever conducted. With over 15 years of proven performance, it can fit many roofing budgets and needs:

- Available in 45, 60, and 80 mil
- Guarantees available up to 30 years*
- 10-ft.-wide sheets can help increase production compared to other roofing technologies
- Different systems available, including mechanically attached, fully adhered, and RhinoBond® Attachment Systems†

EverGuard Extreme® TPO is the overall best-performing TPO you can buy for your property

- The best-performing TPO in accelerated aging in the largest independent TPO study ever conducted
- Offers the longest TPO warranty available in the industry (up to 35 years*)
- Available in a variety of thicknesses and can fit most budgets
  - » EverGuard Extreme® 50 mil and 70 mil have virtually the identical weathering characteristics as our standard 60 mil and 80 mil versions
- Can withstand higher heat and UV exposure better than any membrane in the industry

EverGuard Extreme® & EverGuard® TPO Fleece-Back Membrane...

Provides additional protection and offers a variety of benefits, including:

- Does not require a slip sheet when re-covering over a variety of roofs
- Provides enhanced puncture resistance, especially in areas more prone to hail
- Can be installed using a variety of adhesives that install in approximately half the time as traditional bonding adhesives with smooth membrane

EverGuard® TPO Colors...

Can transform a traditional roof into an aesthetic attribute

- Standard colors include White, Tan, Gray, Energy Gray, and Energy Tan
- 17 additional colors are also available to complement your building design

EverGuard® Freedom™ TPO...

Self-adhered TPO:

- Available in both heat-weldable seams and with Rapid Seam™ Technology
- Warranties available up to 20 years*

The roofing industry is changing.

Just a few years ago, almost all TPO jobs installed were mechanically attached; traditional bonding adhesives made up the remaining installations. Today, new installation methods are becoming increasingly popular.

Traditional systems are tried and true, and are still great solutions, but each roof has unique challenges. At GAF, we have a number of solutions to help overcome all of your roofing challenges.

What factors are most critical for you?

- Lowering labor costs
- Reducing material costs
- Proven methods and consistency
- Wind uplift ratings
- Expanding roofing season during colder weather
- Reducing adhesive odors for occupied buildings
- Increasing hail protection
- VOC content
- Roof aesthetics
- Capital investment costs

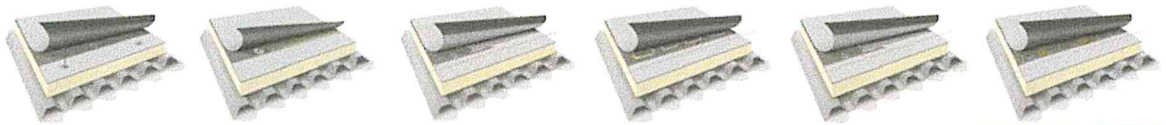
If you're looking for ways to increase production, we offer systems that install:

- Faster
- Easier
- In lower temperatures
- Without the need for expensive sprayers or equipment

*See applicable guarantee/warranty for complete coverage and restrictions.

For more information, contact your local GAF Representative or visit **gaf.com/TPOInstall.**

Take a look at the chart to see which system can best meet your challenges.



	Mechanically Attached Smooth with Drill-Tec™ Fasteners	Fully Adhered Smooth	Fully Adhered Fleece with WB181 Wet Lay-in	Adhered Fleece with Low-Rise Foam	Fully Adhered Fleece with GAF 2-Part Roofing Adhesive	GAF RhinoBond® [1] System
Install Time						[1]
Material Cost						
Application Temperature Range[2]	WIDEST[3]	WIDE	WIDE	WIDE	WIDE	WIDEST[3]
Wind Uplift Ratings	[4]					
Hail Ratings[5]						
Odor	NO ODOR					NO ODOR
VOC-Compliant Options	YES	YES	YES	YES	YES	YES
Tool Investment Needs						
Aesthetics						
Maximum Warranty Length[6]	UP TO 30 YEARS	UP TO 35 YEARS	UP TO 35 YEARS	UP TO 35 YEARS	UP TO 35 YEARS	UP TO 35 YEARS

[1] Time based on multiple machines.
[2] All membrane rolls and adhesives must be stored for at least overnight at a minimum.
[3] See the GAF RhinoBond® and Mechanically Attached Systems Manuals for information on cold weather installation.
[4] Wind uplift ratings can be improved with 6" on center fastening pattern.
[5] When no cover board is used.
[6] See applicable warranties and/or NDL guarantees for details and restrictions.

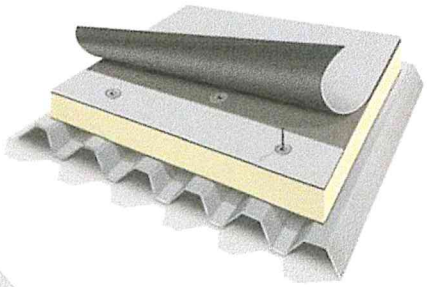
[†]RhinoBond® is a registered trademark of OMG.

For more information, contact your local GAF Representative or visit **gaf.com/TPOInstall.**

GAF EverGuard TPO

MECHANICALLY ATTACHED SMOOTH TPO

with Drill-Tec™ Fasteners



Installing smooth TPO with fasteners in a mechanically attached system offers several benefits, including:

- Up to 50% faster installation compared to fully adhered smooth membrane installations
- Reliability and cost effectiveness
- Familiarity with the industry as the most common installation method in single-ply membranes
- Consistent installation in a wide variety of temperatures
- No sprayers or additional capital investments
- A great option for occupied buildings, as there is no odor from adhesives

While fully adhered systems have better wind uplift ratings, a mechanically attached system's ratings can be increased by modifying the fastening pattern from 12" on center to 6" on center.

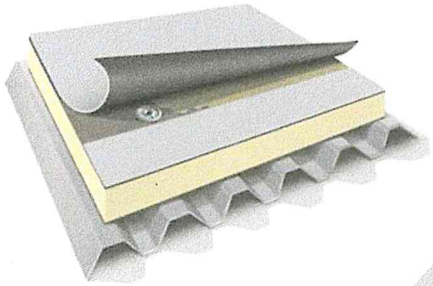
Be sure to refer to the GAF Drill-Tec™ Fastening Guide to choose the correct fasteners and plates for your application.

Step 1 Insulation is fastened to the deck

Step 2 TPO is fastened to the deck at the seam

Step 3 Seams are welded

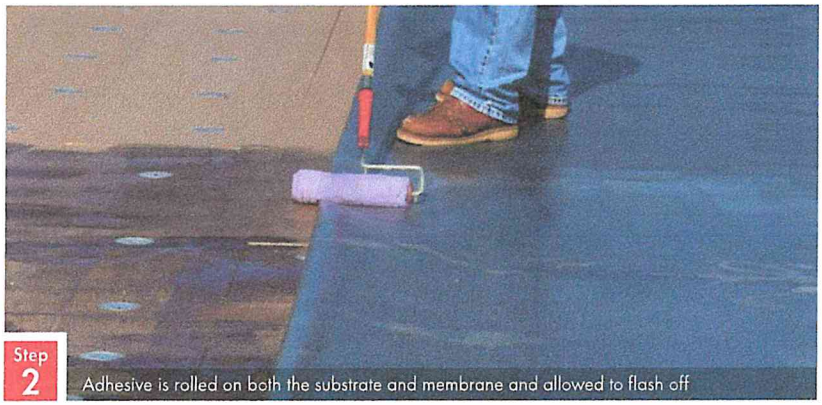
For more information on mechanically attached smooth systems, contact your local GAF Representative or visit **gaf.com/TPOInstall.**



FULLY ADHERED SMOOTH TPO

with Traditional Bonding Adhesive

Step 1 Insulation is fastened to the deck



Step 2 Adhesive is rolled on both the substrate and membrane and allowed to flash off

Step 3 Membrane is welded at the seams and broomed in

Installing fully adhered EverGuard® Smooth TPO Systems offers several benefits, including:

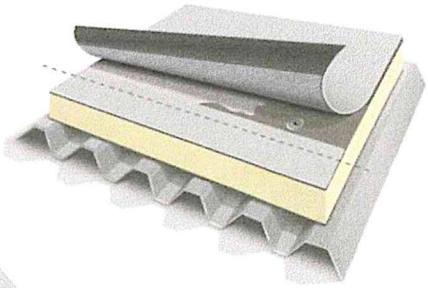
- Longer guarantees compared to mechanically attached systems
- Excellent wind uplift ratings
- A uniform, smooth appearance
- Familiarity with workers, as this installation is common in the industry
- Minimizes thermal drift while acting as a vapor barrier

GAF offers several adhesives that are compatible with EverGuard® Smooth TPO, including:

- **SBA 1121...** The most frequently used, traditional solvent-based GAF bonding adhesive
- **EverGuard® TPO 3 Square and 6 Square Low VOC Bonding Adhesives...** For use in areas where there are VOC regulations
- **EverGuard® WB181 Bonding Adhesive...** A water-based bonding adhesive that is both VOC compliant and low odor
- Install of these systems work best in temperatures above 40°F

FULLY ADHERED FLEECE-BACK TPO

with WB181 Wet Lay-in



Installing fleece-back TPO with EverGuard® WB181 Bonding Adhesive offers several benefits, including:

- Up to 50% faster installation time than traditional smooth, fully adhered systems
- Reduced labor costs
- Low-VOC content with little-to-no odor, which reduces the disruption to building occupants
- Additional puncture resistance due to the fleece backing of EverGuard® membrane

Additionally, this system offers many of the other benefits in fully adhered systems, such as:

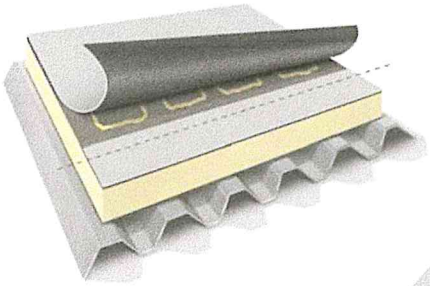
- Longer guarantees compared to mechanically attached systems
- Excellent wind uplift ratings
- A uniform, smooth appearance
- Minimized thermal drift while acting as a vapor barrier
- Installation of this system works best in temperatures above 40°F

Step 1 Adhesive is applied directly to deck

Step 2 Membrane is rolled into adhesive while still wet

Step 3 Seams are welded and broomed in

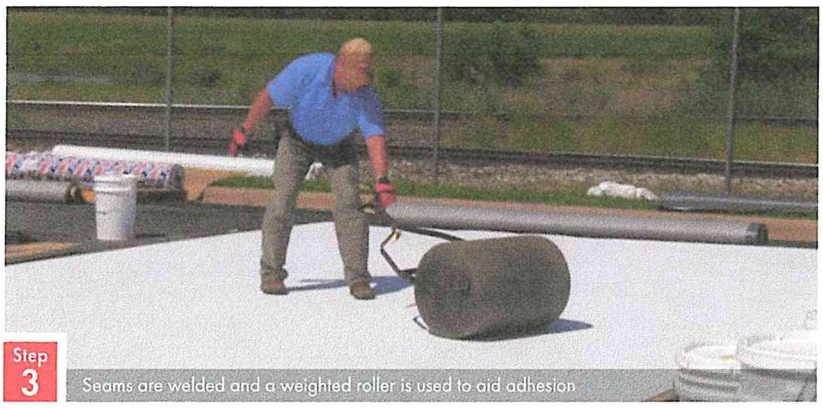
For more information on a fully adhered fleece-back system with a WB181 wet lay-in, contact your local GAF Representative or visit **gaf.com/TPOInstall.**



ADHERED FLEECE-BACK TPO
with Low-Rise Foam

Step 1 Adhesive is applied in beads

Step 2 Membrane is installed after foam adhesive rises



Step 3 Seams are welded and a weighted roller is used to aid adhesion

Installing fleece-back TPO with low-rise foam roofing adhesive offers several benefits, including:

- Up to 50% faster installation time than traditional smooth, fully adhered systems
- Reduced labor costs
- Low-VOC content with little-to-no odor, which reduces the disruption to building occupants
- Additional puncture resistance due to the fleece backing of EverGuard® membrane

Additionally, this system offers many of the other benefits in fully adhered systems, such as:

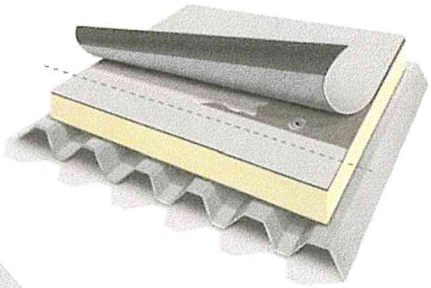
- Longer guarantees compared to mechanically attached systems
- Excellent wind uplift ratings
- A uniform, smooth appearance
- Installation of this system works best in temperatures above 40°F
- Refer to the *GAF EverGuard® Adhered Roofing Systems Manual* for ribbon spacing and guarantee requirements

For more information on low-rise foams and cold weather options, contact your local GAF Representative or visit **gaf.com/TPOInstall.**

GAF EverGuard TPO

FULLY ADHERED FLEECE-BACK TPO

with GAF 2-Part Roofing Adhesive

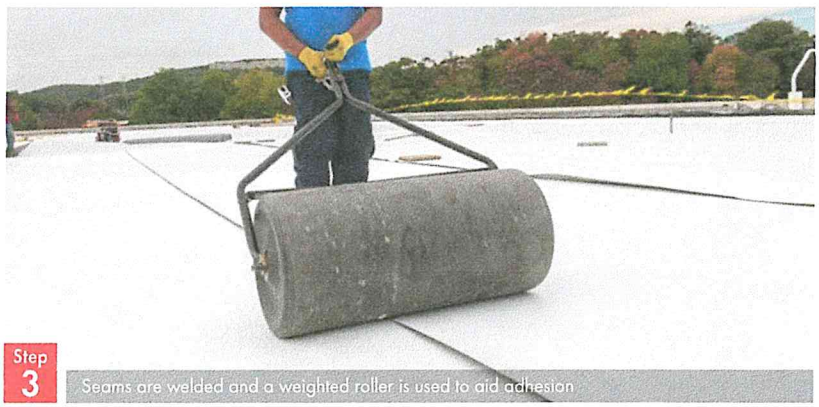


Installing fleece-back TPO with GAF 2-Part Roofing Adhesive offers several benefits, including:

- Up to 50% faster installation than traditional fully adhered, smooth systems (it's as easy as watering your lawn)
- Increased productivity and smaller crews versus other attachment methods
- Up to 20 squares of coverage per set of containers
- Longer guarantees compared to mechanically attached systems
- No expensive equipment or maintenance
- Excellent wind uplift performance
- Increased puncture resistance due to the fleece backing of EverGuard® membrane
- Low-VOC content with low odor
- Installation of this system works best in temperatures above 40°F

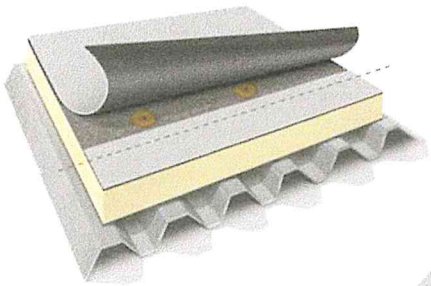
Step 1 Adhesive is applied in a spatter pattern

Step 2 Membrane is installed after the foam adhesive has changed color

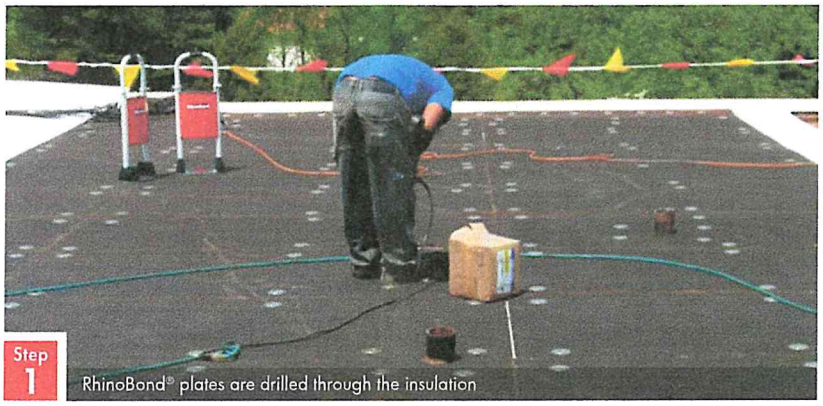


Step 3 Seams are welded and a weighted roller is used to aid adhesion

For more information on a fully adhered fleece-back system using GAF 2-Part Roofing Adhesive, contact your local GAF Representative or visit **gaf.com/TPOInstall.**



GAF RHINOBOND® SYSTEM



Step 1

RhinoBond® plates are drilled through the insulation

Step 2

Membrane is rolled in and welded at the seams

Step 3

The RhinoBond® machine and magnets weld the membrane to each plate

Installing smooth TPO with the RhinoBond®† Attachment System offers several benefits, including:

- A fast and easy installation
- Smaller crews and install time, with up to 50% faster installation by adding a second machine
- Quick dry-in, as membrane seams can be welded before RhinoBond® Plates are bonded

RhinoBond® Attachment Systems are eligible for the same warranties as fully adhered systems, and can also be installed:

- In a wide variety of temperatures
- Without waiting for cure time, fumes, mess, empty pails, or VOCs from traditional adhesives

In addition, RhinoBond® Attachment Systems have advantages over traditional mechanically attached systems, including:

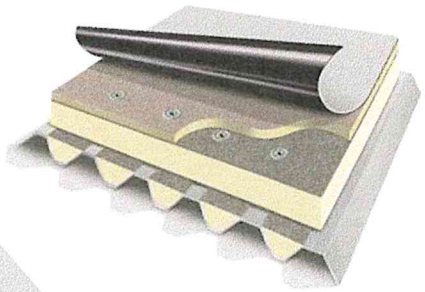
- No half sheets and less seams
- Longer warranties
- No fastener penetrations in the field or seams of the membrane
- Less flutter with optimized attachment across the entire sheet

†RhinoBond® is a registered trademark of OMG.

For more information on the RhinoBond® Attachment System, contact your local GAF Representative or visit **gaf.com/TPOInstall.**

GAF EverGuard TPO

ENERGYGUARD™ POLYISO INSULATION



GAF EnergyGuard™ Polyiso Insulation is manufactured in our state-of-the-art plants using the latest technology and providing the highest-quality products. And our Gainesville, Texas, and Cedar City, Utah, plants can provide full system shipment of both polyiso and TPO products.

EnergyGuard™ Polyiso Insulation is available in thicknesses ranging from 1" to 4.6" in either 4' x 4' or 4' x 8' boards, as well as in tapered panels with slopes of 1/16", 3/16", 1/8", 1/4", and 1/2".

It also offers various facers and compressive strength options depending on your specification needs.

Polyiso offers one of the highest LTTR insulation values compared to any other FM Class 1-rated product of equivalent thickness.

Meets FM 4450/4470 (consult RoofNav.com for specific assemblies) and UL 1256/790/263.

Manufactured with EPA-compliant blowing agents containing no CFCs or HCFCs; has zero ozone depletion potential (ODP) and virtually no global warming potential (GWP).

Its light weight makes it easier and quicker to install; easier cutting in the field provides simplified fabricating on the roof deck.

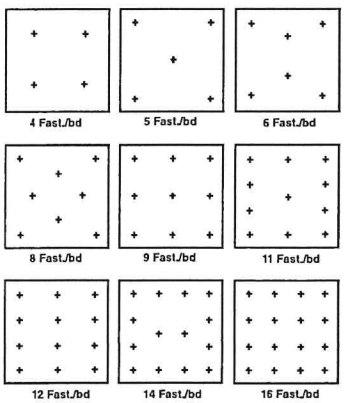
For more information on tapered polyiso insulation, contact your local GAF Representative or visit **gaf.com/EnergyGuard.**

EnergyGuard™ Polyiso Insulation offers a complete lineup of products to meet almost any low-slope commercial roofing insulation need. It provides exceptional thermal performance at an economical price.

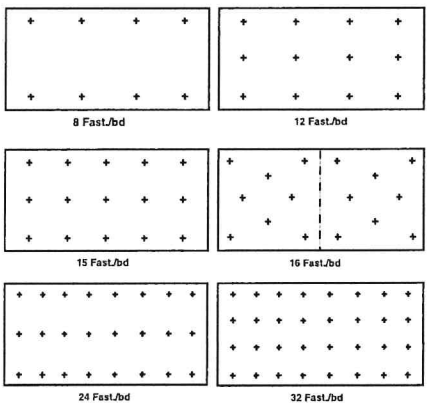
- **EnergyGuard™ Polyiso Insulation...** Glass fiber-reinforced cellulosic felt facers bonded to a core of isocyanurate foam and available with a compressive strength of 20 psi or 25 psi. Meets the requirements of ASTM C1289 Type II, Class 1, Grade 2 (20 psi) and Grade 3 (25 psi).
- **EnergyGuard™ Ultra Polyiso Insulation...** Coated glass facers bonded to a core of isocyanurate foam and available with a compressive strength of 20 psi or 25 psi. Meets the requirements of ASTM C1289 Type II, Class 2, Grade 2 (20 psi) and Grade 3 (25 psi). Ideal to help mitigate mold growth.
- **EnergyGuard™ Tapered Polyiso Insulation...** TAPERED DESIGN GROUP Glass fiber-reinforced cellulosic felt facer or coated glass facers bonded to a core of isocyanurate foam, which helps eliminate ponding water issues. For more information on tapered polyiso insulation, visit **gaf.com/EnergyGuard.**
- **EnergyGuard™ HD & HD PLUS Polyiso Insulation...** Coated glass facers bonded to a core of isocyanurate with a compressive strength of 80 psi or 110 psi. Meets the requirements of ASTM C1289 Type II, Class 4, Grade 1 (80 psi) and Grade 2 (110 psi). Ideal for protecting your roof against high traffic and the elements.
- **EnergyGuard™ Polyiso Insulation Custom Cut...** Available in Ultra as well, it is designed to fill the flutes of a standing seam or lap metal roof retrofit system in order to provide a level surface for TPO or PVC membranes, as well as to provide an increased R-value to the existing structure. It is available in either a straight or bevel-cut edges.

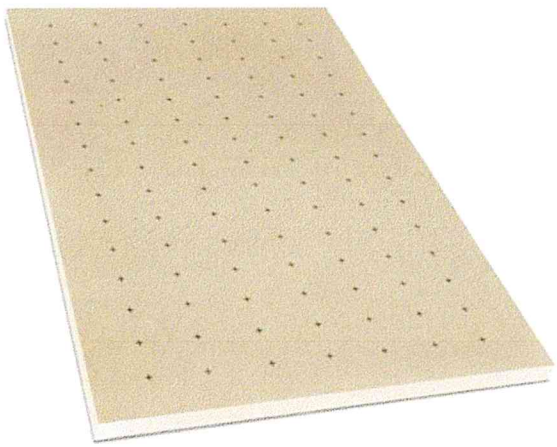
Unique fastening pattern guidelines to help improve speed and accuracy when installing.

4' x 4' Boards



4' x 8' Boards





For more information on tapered polyiso insulation, contact your local GAF Representative or visit **gaf.com/EnergyGuard.**

GAF EverGuard TPO

GAF PERIMETER EDGE METAL

Perimeter edge metal provides many benefits in addition to aesthetics, such as:

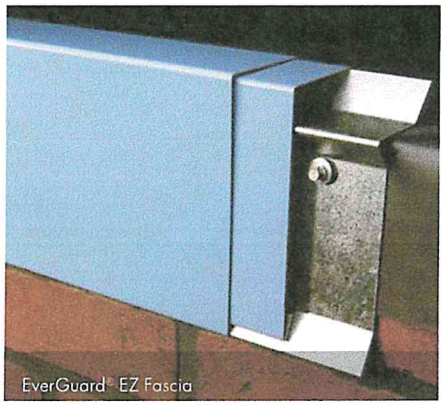
- Functions as the termination and transition between the roof and other building components
- Ensures product consistency and performance
- Increases productivity by eliminating fabrication time
- Provides proper attachment due to pre-punched slotted holes
- Allows for thermal movement
- Can be installed with high-torque screws instead of nails
- Factory-fabricated corners and accessories come pre-manufactured, providing a clean look while eliminating field labor

GAF Perimeter Edge Metal offers a full lineup of pre-fabricated coping, fascia, drip edges, gutters, downspouts, and trim in both steel and aluminum in a variety of KYNAR®-coated colors.

All products are FM approved and ES-1 tested since they are the first line of protection in a wind event.


M-Weld™ Snap-on Coping
M-Weld™ Snap-on Coping Plus

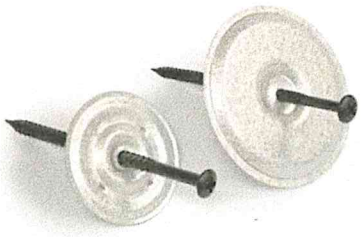

EverGuard® Snap-on Fascia


EverGuard® EZ Fascia


M-Weld™ EZ Fascia EX

- **M-Weld™ Gravel Stop MB Fascia...** Pre-punched slotted holes; self-locating cleat.
- **EverGuard® Snap-On Fascia...** Economical solution for single-ply membranes that are less than 60 mils.
- **M-Weld™ Snap-On Coping...** 20-gauge cleat designed to improve contractor productivity. No need for caulking or sealing at fasteners or joints; preformed splice channel directs water to the roof.
- **EverGuard® EZ Fascia...** High-performance cleat with snap-on cover; reduces labor and enhances roof system integrity.
- **M-Weld™ EZ Fascia EX...** Two-piece snap-on fascia system with heavy-duty aluminum retainer to improve contractor productivity and enhance roof system performance.
- **M-Weld™ Snap-On Plus Coping...** Heavy 16-gauge cleat for higher wind resistance; no need for caulking or sealing at fasteners or joints; preformed splice channel directs water to the roof.

For more information on perimeter edge metal, contact your local GAF Representative or visit **gaf.com/EdgeMetal.**



DRILL-TEC™ FASTENERS

DRILL-TEC™

Flat Plate
for Insulation

Double Barbed XHD® Plate
for Membrane

Drill-Tec™ #12 Fasteners

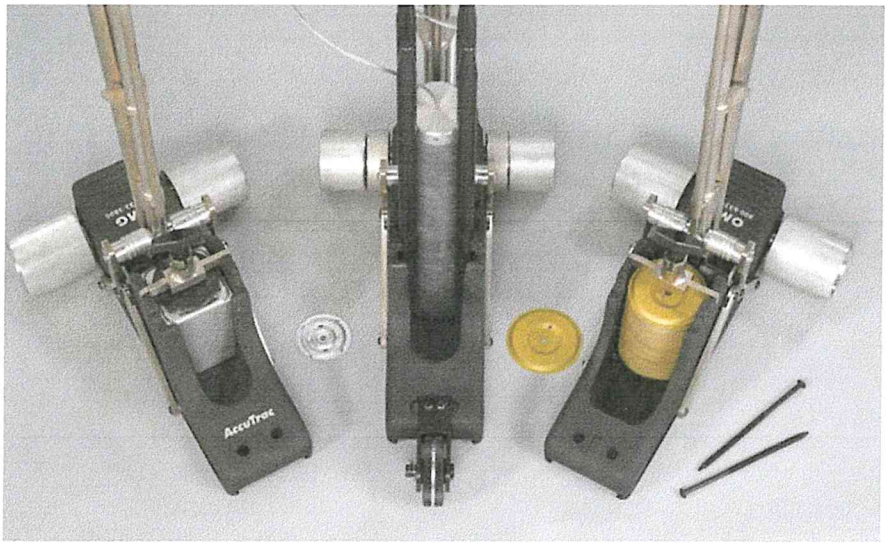
Drill-Tec™ Fasteners and Plates offer a comprehensive lineup of insulation and membrane products that can be used on almost any deck type. The fasteners are made with high-quality corrosion-resistant stainless steel alloy and the plates of Galvalume®-coated steel to provide the performance you can rely on.

Drill-Tec™ Fasteners...
Come in a wide range of lengths and head types.

Insulation Plates...
For both regular, flat polyiso insulation as well as cover board applications.

Membrane Plates...
A wide variety of membrane plates, including double-barbed 2 3/8" plate options, exclusive to GAF, which can increase wind uplift ratings compared to standard single-barbed plates.

GAF Drill-Tec™ Fasteners and Plates meet all the standards required by Factory Mutual (FM) and Underwriters Laboratories (UL) to reduce your labor cost and increase your productivity. Most all the Drill-Tec™ Fasteners and Plates are compatible with OMG Accutrac®, OMG AccuSeam®, and RhinoBond®† tools.



†RhinoBond® is a registered trademark of OMG.

For more information on Drill-Tec™ Fasteners, contact your local GAF Representative or visit **gaf.com/DrillTec.**

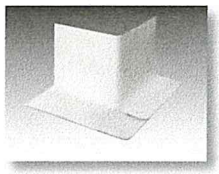
GAF EverGuard TPO

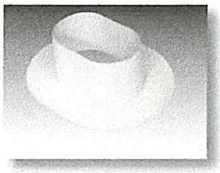
EVERGUARD® TPO
Prefabricated Accessories

• Watertight • Consistent, field-tested quality • Proven to reduce total installed cost by up to 12%*

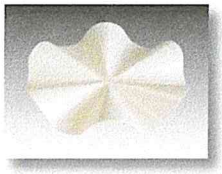
Walkway Roll
Heat welds directly to TPO membrane or installed with seam tape; available in gray and yellow

Corner Curb Wrap
Four standard sizes to flash curbs that are 24", 36", 48", and 60" in size

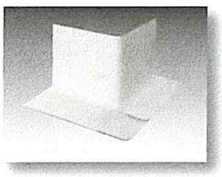




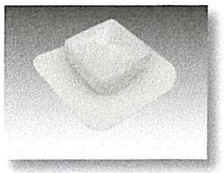
Pourable Sealer Pocket
Structural foundation for EverGuard® Pourable Sealant



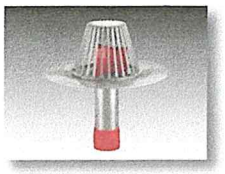
Fluted Corner
For use in flashing outside corners of base and curb flashings



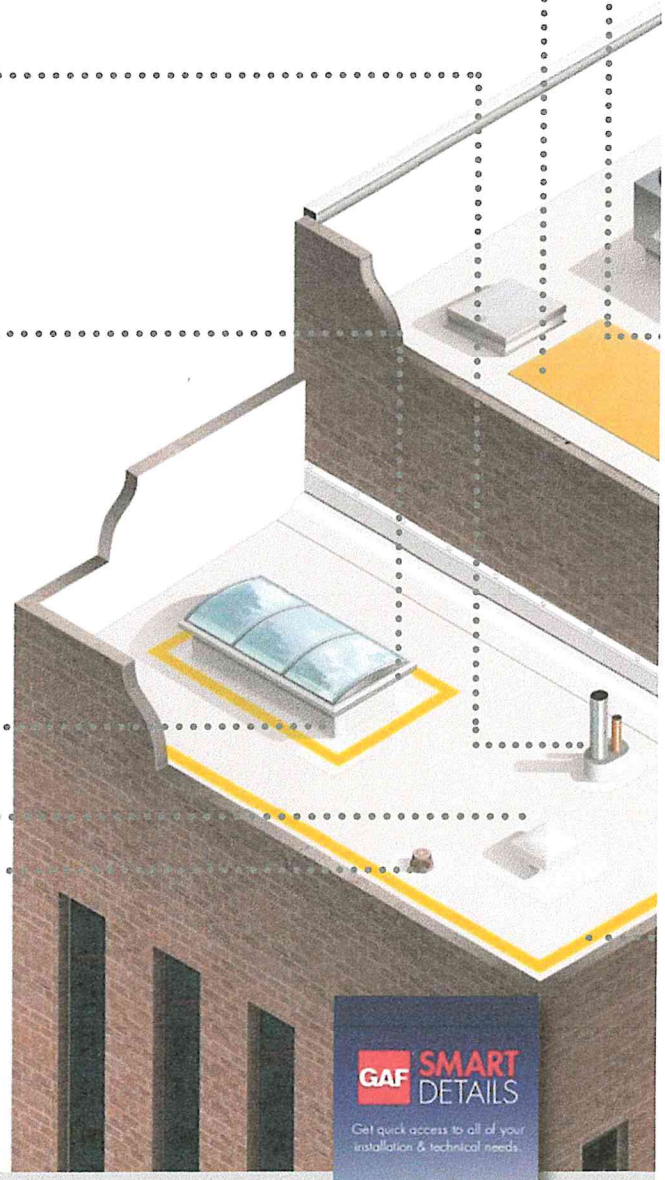
Universal Corner
Accommodates both inside and outside corners of base and curb flashings



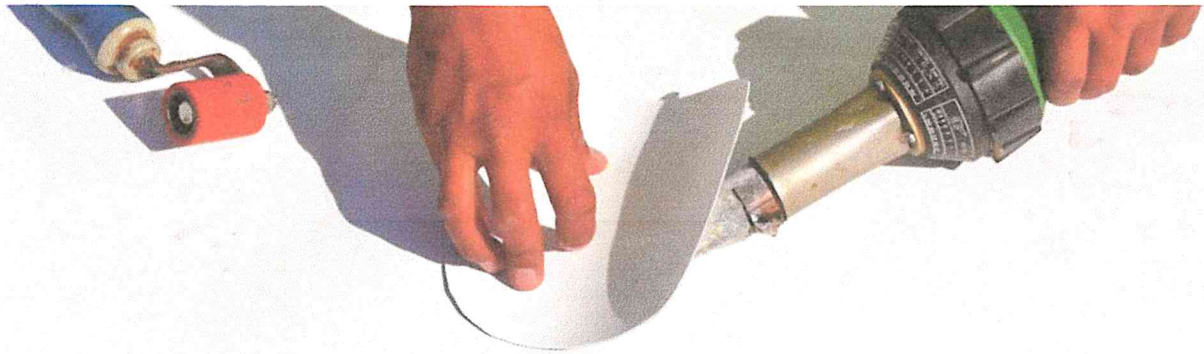
Vent
Limits air flow to one direction, avoiding moisture buildup



Coated SPEEDTITE™ Drain
TPO or PVC-coated flange for direct hot-air welding of TPO or PVC roof membranes



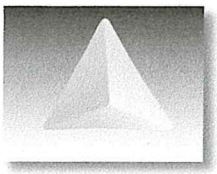
Get quick access to all of your installation and technical needs at **gaf.com/smartdetails.**



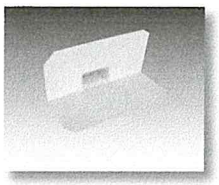
*Compared to GAF estimate to field-fabricate flashing details.

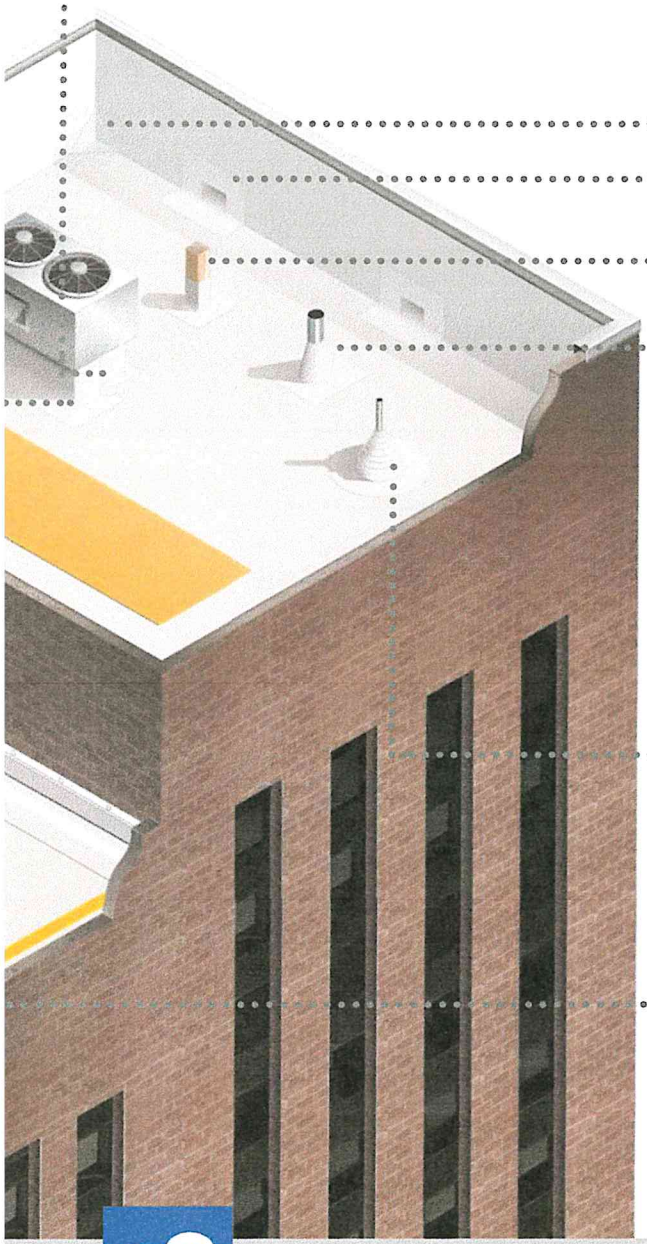
T-Joint Cover Patches
Conforming seal for use over T-joints in 60 and 80 mil membrane applications

Inside Corner
Manufactured to accommodate inside corners of base and curb flashings



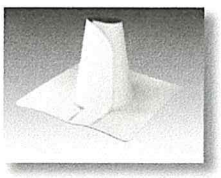
Scupper
TPO can be heat welded to the scupper for a strong, secure installation



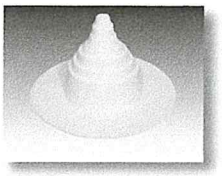


Square Tube Wrap
Tube wraps are split with overlap to wrap around square or rectangular tubing; ensures a solid weld

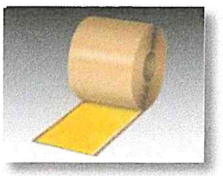
Preformed Split Pipe Boot
Three standard sizes accommodate most pipes and conduits



Preformed Vent Boot
Accommodates most common pipes and conduits from 1" to 6"



Yellow Safety Tape
Provides a warning to take caution around potential roof hazards



For more information on TPO accessories, contact your local GAF Representative or visit **gaf.com/TPOAccessories.**

GAF EverGuard TPO

SUPPORT SERVICES

Can Help To Make Your Roofing Project a Success!

GAF Sustainability Mission Statement

GAF is the only roofing manufacturer to publish Health Product Declarations (HPDs) and Environmental Product Declarations (EPDs) for both TPO and ISO products, which means there are no secrets about the materials you're using on your roofing project.

- The Health Product Declaration (HPD) Open Standard consists of a defined Format and Instructions for reporting about the contents of building products along with the associated health and other related information.
- An Environmental Product Declaration (EPD®) is an independently verified and registered document that communicates transparent and comparable information about the life cycle environmental impact of products.

GAF EverGuard Extreme® TPO is also the first TPO to receive the Cradle To Cradle™ Certification (Silver Level) from the Cradle To Cradle Products Innovation Institute.

The Best Roofing Contractors

GAF selects less than 2 out of every 100 roofing contractors for our factory-certified commercial contractor program. We provide them with extensive training tools and support to help ensure proper material installation, improve their processes, and enhance their capabilities. GAF guarantees that include coverage for workmanship are available through this elite contractor force.

Certified Maintenance Professional (CMP) & Sustainable Roofing Council (SRC) Programs

Having a maintenance program in place for your roofing asset is critical for not only optimizing its overall longevity and performance but also helping ensure you have uninterrupted guarantee coverage if issues arise. GAF Certified Maintenance Professionals (CMPs) are contractors who have not only the expertise to maintain and service your roof but also the exclusive ability to extend your Diamond Pledge™ NDL Roof Guarantee by 25%—via the WellRoof® Guarantee Extension;* at no cost to you. Contact GAF Guarantee Services for details. Also, benefit from working with a member of the Sustainable Roofing Council (SRC). Educated in emerging green practices such as membrane and insulation recycling, LEED®, and the technology behind cool roofing, an SRC member is the right choice to install your new cool roofing system.

Architectural Information Services

Architects and specifiers can access an entire team devoted to assisting you with the specification process. They can answer questions and provide assistance with master specification preparation and other valuable activities at no charge to you. Call them toll free: 800-522-9224 or email AIS@GAF.com.

Full-Time Field Services Team

Our nationwide team of Field Services Professionals helps ensure your new roof is installed right the first time. They are a full-time, professionally trained resource. Our team is a trusted source for information, installation training, and best-practice sharing to help prevent problems before they happen.

For more information about GAF sustainability, contact your local GAF Representative or visit **www.sustainableminds.com/GAF.**

Weather Stopper™

INDUSTRY-LEADING GUARANTEES

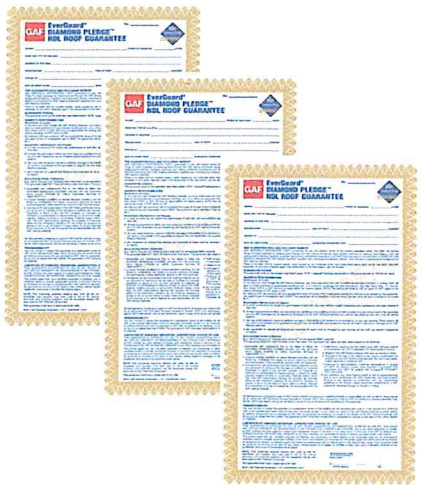
- **Diamond Pledge™ NDL Roof Guarantee**
  No dollar amount on your coverage; unlike competitive guarantees, provides true "edge-to-edge" coverage, with additional leak coverage for penetrations and metal components.**
- **WellRoof® Guarantee Extension**
  Provides a 25% extension on a Diamond Pledge™ NDL Roof Guarantee when you participate in an annual inspection and preventative maintenance program with a GAF Certified Maintenance Professional.*
- **All-American Pledge™ Roof Guarantee**
  The industry's only guarantee that covers both steep- and low-slope roofing projects (in one guarantee) for single-source accountability—and your convenience.**

	EverGuard TPO		EverGuard Extreme TPO	
MILS	MECHANICALLY ATTACHED	FULLY ADHERED/ RHINOBOND®	MECHANICALLY ATTACHED	FULL ADHERED/ RHINOBOND®†
45	15 YEARS	20 YEARS		
50			20 YEARS	25 YEARS
60	20 YEARS	25 YEARS	25 YEARS	30 YEARS
70			30 YEARS	30 YEARS
80	25 YEARS	30 YEARS	30 YEARS	35 YEARS

*Guarantees of 30 and 35 years do not qualify for *WellRoof® Guarantee Extension.*
**See applicable GAF roof guarantee for complete coverage and restrictions.

Technical Help When It Matters

Our 1-800-ROOF-411 hotline is available to answer technical questions live. Our Technical team can answer questions regarding installation, codes, product approvals, roof system details, and other technical issues. They are a complete technical resource dedicated to supporting proper roof installation.



†RhinoBond® is a registered trademark of OMG.

For more information on guarantees, contact your local GAF Representative or visit **gaf.com.**

GAF EverGuard TPO

SECTION 07540

THERMOPLASTIC SINGLE-PLY ROOFING

Gallman Place Roof Renovation

***NOTE: ALL ITEMS IN RED REPRESENT CHOICES FOR YOUR SPECIFIC DESIGN.
Please make your selection and delete what does not pertain to your roofing system.
Deletions can be made by simply highlighting text and pressing the "DELETE" key.
Changes in Text Color can be made by highlighting text and right clicking the mouse to choose a new color.

PREPARED BY:

GAF® Architectural Information Services

PROJECT NO: TPO Mechanically Attached 1

Note: GAF does not practice architecture or engineering. This Design Line is provided as a guide specification and is based on criteria provided to GAF. GAF has not observed the jobsite conditions, contract specifications, or other documents and shall not be construed in any manner to be the designer of record.

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
1. Thermoplastic Polyolefin Single-Ply Roofing Membrane
2. Thermoplastic Polyolefin Flashings
3. Thermoplastic Polyolefin Accessories
4. Insulation

B. Related Sections
1. Section 06100: Rough Carpentry
2. Section 07620: Sheet Metal Flashing and Trim
3. Section 15430: Plumbing Specialties

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM) - *Annual Book of ASTM Standards*
1. ASTM D-751 – Standard Test Methods for Coated Fabrics
2. ASTM D-2137 - Standard Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics
3. ASTM E-96 - Standard Test Methods for Water Vapor Transmission of Materials
4. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
5. ASTM D-471 - Standard Test Method for Rubber Property—Effect of Liquids
6. ASTM D-1149 - Standard Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment
7. ASTM C-1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
8. ASTM C-1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
9. ASTM E 903 – Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres
10. ASTM G155 - Standard Practice For Operating Xenon Arc Light Apparatus For Exposure Of Non-Metallic Materials
11. ASTM D573 - Standard Test Method For Rubber - Deterioration In An Air Oven

B. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - *Architectural Sheet Metal Manual*

C. National Roofing Contractors Association (NRCA)

D. American Society of Civil Engineers (ASCE)

E. U.S. Green Building Council (USGBC)
1. Leadership in Energy and Environmental Design (LEED)

F. Factory Mutual (FM Global) - *Approval Guide*

G. Underwriters Laboratories (UL) - *Roofing Systems and Materials Guide* (TGFU R1306)

H. California Title 24 Energy Efficient Standards

I. ENERGY STAR

J. Cool Roofing Rating Council (CRRC)

K. Miami-Dade County

1.03 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) *Roofing and Waterproofing Manual* for definitions of roofing terms related to this section.

1.04 SUBMITTALS

A. Product Data: Provide product data sheets for each type of product indicated in this section.

B. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.

C. Samples: Provide samples of insulations, fasteners, membrane materials and accessories for verification of quality.

D. Certificates: Installer shall provide written documentation from the manufacturer of their authorization to install the roof system, and eligibility to obtain the warranty specified in this section.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: GAF shall provide a roofing system that meets or exceeds all criteria listed in this section.

B. Installer's Qualifications:
1. Installer shall be classified as a ***Master or Master Select™*** contractor as defined and certified by GAF.

C. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

D. Final Inspection
Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed.

1.06 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, GAF representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions and agreements reached (or disagreements), and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to roofing work.

1.07 PERFORMANCE REQUIREMENTS

A. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

B. GAF shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

1.08 REGULATORY REQUIREMENTS

A. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver all roofing materials to the site in original containers, with factory seals intact. All products are to carry a GAF® label.

B. Store all pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.

C. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.

D. Remove manufacturer supplied plastic covers from materials provided with such. Use "breathable" type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material will be installed.

E. Materials shall be stored above 55°F (12.6°C) a minimum of 24 hours prior to application.

1.10 PROJECT CONDITIONS

A. Weather
1. Proceed with roofing only when existing and forecasted weather conditions permit.
2. Ambient temperatures must be above 45°F (7.2°C) when applying hot asphalt or water based adhesives.

1.11 WARRANTY

A. Provide Manufacturers standard EverGuard® Diamond Pledge™ Guarantee with single source coverage and no monetary limitation where the manufacturer agrees to repair or replace components in the roofing system, which cause a leak due to a failure in materials or workmanship.
1. Duration: Up to Twenty (20) years from the date of completion.

*Materials and workmanship of listed products within this section when installed in accordance with current GAF application and specification requirements. Contact GAF Contractor Services for the full terms and conditions of the guarantee.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. GAF® - 1 Campus Drive, Parsippany, NJ 07054

2.02 INSULATION
(Recommending two layers of insulation to mitigate thermal bridging. Please refer to local codes agency to determine man dated requirements for your area.)

A. Rigid polyisocyanurate board, with a glass-reinforced cellulosic felt facer. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 1, Grade 2. EnergyGuard™ Polyiso Insulation, with the following characteristics:
1. Board Thickness: Insert Thickness
2. Thermal Resistance (LTTR value) of: Please refer to the EnergyGuard™ Polyiso Insulation Data Sheet
3. Compressive Strength: 20 psi

B. Rigid polyisocyanurate board, with a glass-reinforced cellulosic felt facer. Conforms to or exceeds the requirements of ASTM C 1289 Type II, Class 1, Grade 2. EnergyGuard™ Polyiso Insulation, with the following characteristics:
   1. Board Thickness: Insert Thickness
   2. Thermal Resistance (LTTR value) of: Please refer to the EnergyGuard™ Polyiso Insulation Data Sheet
   3. Compressive Strength: 20 psi

2.03 MEMBRANE MATERIALS

A. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed, FM Approved, Dade County Product Approval, Florida Building Code Approved. White membrane is Energy Star Listed, CRRC Listed and Title 24 Compliant. **EverGuard® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF.
   1. 10' X 100', each roll contains 1000 sq. ft. of roofing material weighing 322 lbs. Each half sheet roll contains approximately 500 sq. ft. of roofing material, 5' X 100', weighing 162 lbs. Half sheet roll required for roof perimeter use in mechanically attached systems.
      a) Available Stock Colors: White, Gray, Tan, Energy Gray, Energy Tan
      b) Available Pre-Formulated Colors: Colonial Red, Dark Brown, Dark Bronze, Desert Tan, Electric Blue, Goldenrod, Ivy Green, Moss Green, Patina Green, Slate Gray, Teal, Terra Cotta, Tropical Green, Smoke Gray, Regal Red Regal Blue Hartford Green
      c) Custom colors available

2.04 FLASHING MATERIALS

A. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed, FM Approved, Dade County Product Approval, Florida Building Code Approved. White membrane is Energy Star Listed, CRRC Listed and Title 24 Compliant. **EverGuard® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF.

2.05 ADHESIVES, SEALANTS and PRIMERS (Option 1 – Solvent Based Adhesives)
(Select appropriate adhesives, as per GAF's application and specification guidelines. Please note that some adhesives and primers are restricted in certain geographical areas.)

A. Solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard TPO membranes, **EverGuard® 1121 Bonding Adhesive**, by GAF.

B. Solvent based liquid, required to protect field cut edges of EverGuard TPO membranes. Applied directly from a squeeze bottle, **EverGuard® TPO Cut Edge Sealant**, by GAF.

C. Solvent based primer for preparing surfaces to receive butyl based adhesive tapes, **EverGuard® TPO Primer**, by GAF.

D. Solvent based seam cleaner used to clean exposed or contaminated seam prior to heat welding, **EverGuard® TPO Seam Cleaner, by GAF.**

E. Solvent based, trowel grade synthetic elastomeric sealant. Durable and UV resistant suitable for use where caulk is typically used. Available in 10 oz. tubes, **FlexSeal™ Caulk Grade Roof Sealant** by GAF.

F. Commercial grade roofing sealant suitable for sealing the upper lip of exposed termination bars and penetrations and around clamping rings and comes with a 20 yr. ltd warranty against leaks caused by manufacturing defects. Meets the performance criteria of ASTM D412, ASTM D2196, ASTM D1475 and ASTM D1644, **FlexSeal™** Roof Sealant, by GAF.

2.06 ADHESIVES, SEALANTS and PRIMERS (Option 2 – Low VOC Adhesives)
(Select appropriate adhesives, as per GAF's application and specification guidelines. Please note that some adhesives and primers are restricted in certain geographical areas.)

A. Low VOC solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard TPO membranes, **EverGuard® Low VOC Bonding Adhesive**, by GAF. Available in 3 square or 6 square coverage rates.

B. Low VOC solvent based primer for preparing surfaces to receive butyl based adhesive tapes, **EverGuard® TPO Low VOC Primer**, by GAF.

C. Low VOC TPO cleaner designed to clean exposed or contaminated seams prior to heat welding to remove any residual soap or revitalize aged membranes. Contains only 50 grams per liter of Volatile Organic Content and has been formulated using a blend of primarily VOC-exempt ingredients to be in compliance with air quality regulations for single ply roofing products. **EverGuard® CleanWeld® Cleaner** by GAF®.

D. One part butyl based high viscosity sealant suitable for sealing between flashing membrane and substrate surface behind exposed termination bars and for sealing between roofing membrane and drain flange. **EverGuard® Water Block**, by GAF.

E. One-part, moisture-cure, self-leveling sealant designed for use in pitch pans on single ply roof systems. **EverGuard® One-Part Pourable Sealant**.

2.07 ACCESSORIES
(Please select appropriate membrane fasteners for the deck type, per the GAF® Specifications Manual)

A. Mechanical Fasteners
1. **Drill•Tec™ Standard Screws**: Standard duty alloy steel insulation fastener with CR-10 coating with a .220" diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips head for use on steel and wood decks.
2. **Drill•Tec™ HD Screws**: Heavy gauge alloy steel fastener with CR-10 coating with a .245" (6.2 mm) diameter thread. Miami Dade and Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on wood, concrete and steel decks.
3. **Drill•Tec™ XHD Screws**: Heavy gauge alloy steel fastener with CR-10 coating with a .275" (6.9 mm) diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on heavy steel decks, O.S.B or aluminum roof decks.
4. **Drill•Tec™ Insulation Plates**: Galvalume, 3" (76 mm) diameter, suitable for use with Drill•Tec™ Standard and HD screws, and Drill•Tec™ Spikes. Special design available for use with Drill•Tec™ Polymer Screws.
5. **Drill•Tec™ XHD Plates**: Galvalume, 2 3/8" (60 mm) diameter, with a barbed underside. Suitable for use with Drill•Tec™ Standard, HD, and XHD Screws, Purlin Fasteners and Drill•Tec™ Spikes.

B. FLASHING ACCESSORIES

1. A smooth type, unreinforced thermoplastic polyolefin based membrane for use as an alternative flashing/reinforcing material for penetrations and corners. Required whenever preformed vent boots cannot be used, available in White, Tan, Gray, Regal Red, Regal Blue, and Hartford Green, 0.055 inches (55 mils) nominal thickness and sheet size: 24in x 50ft. **EverGuard® TPO Detailing Membrane**, by GAF.

2. An 8 inch (20 cm) wide smooth type, polyester scrim reinforced thermoplastic polyolefin membrane strip for use as a cover strip over coated metal and stripping-in coated metal flanges and general repairs: 0.045 inches (45 mils) nominal thickness with 100 foot length, available in White, Tan, Gray, Regal Red, Regal Blue, and Hartford Green **EverGuard® TPO Flashing Membrane**, by GAF.

3. Extruded aluminum termination bar with angled lip caulk receiver and lower leg bulb stiffener. Pre-punched slotted holes at 6" on center or 8" on center. ¾" x 10' with 0.090" cross section, **Drill-Tec™ Termination Bar,** by GAF.

4. A 6 inch (14 cm) wide, smooth type, heat-weldable polyester scrim reinforced thermoplastic polyolefin membrane strip. Designed for use as a cover strip over non-coated metal edges and flanges. Each full roll contains approximately 100 Lineal Ft. of material, 6" X 100'. **EverGuard® TPO Heat-Weld Cover Tape**, by GAF.

5. .045" reinforced TPO membrane with pressure sensitive adhesive, to be installed on horizontal surfaces using plates and fasteners as a base attachment in fully adhered systems. Size 6" x 100', **EverGuard® RTA (Roof Transition Anchor) Strip™,** by GAF

6. 24 gauge steel with 0.025" thick TPO based film as required for fabrication into metal gravel stop and drip edge profiles, metal base and curb flashings, sealant pans, and scupper sleeves. Standard sheet size 4' x 10', sheet weight 47 lbs. Custom sizes available, **EverGuard® TPO Coated Metal**, by GAF.
   a) Available Stock Colors: White, Gray, Tan, Regal Red, Regal Blue, Hartford Green
   b) Available Pre-Formulated Colors: Colonial Red, Dark Brown, Dark Bronze, Desert Tan, Electric Blue, Goldenrod, Ivy Green, Moss Green, Patina Green, Slate Gray, Teal, Terra Cotta, Tropical Green, Smoke Gray, Energy Gray, Energy Tan
   c) Custom colors available

C. WALL & CURB ACCESSORIES

1. 55 mil TPO membrane and 24 gauge coated metal prefabricated into standard and custom size thru wall scuppers**.** Available in two sizes: 4" x 6" x 12" (l x w x d) with a 5.75" x 3.75" opening and 8" x 10" x 12" (l x w x d) with a 9.75" x 7.75" opening, **EverGuard® TPO Scupper,** by GAF

2. .045" thick reinforced TPO membrane fabricated corners. Available in four standard sizes to flash curbs. Four corners are required to flash the curb, **EverGuard® Corner Curb Wraps,** by GAF.

3. 0.045" thick molded TPO membrane outside corners of base and curb flashing. Hot-air welds directly to EverGuard TPO membrane. Size 4" x 4" with 6" flange, **EverGuard® TPO Universal Corners** by GAF.

4. 0.055" molded TPO membrane inside corners of base and curb flashing. Hot-air welds directly to EverGuard TPO membrane. Size 6" x 6" x 5.5" high **EverGuard® TPO Preformed Corners** by GAF.

5. 8" diameter, nominal .050" vacuum formed unreinforced TPO membrane for use in flashing outside corners of base and curb flashings, **EverGuard® TPO Fluted Corner**, by GAF.

D. PENETRATION ACCESSORIES

1. 0.075" thick molded TPO membrane sized to accommodate most common pipe and conduits, (1" to 6" diameter pipes), including square tube. Hot-air welded directly to EverGuard TPO membrane, supplied with stainless steel clamping rings, **EverGuard® TPO Preformed Vent Boots** by GAF.

2. 0.045" thick molded TPO membrane preformed boots are split to accommodate most common pipes and conduits and available in three standard sizes, **EverGuard® TPO Split Pipe Boots**, by GAF.

3. 0.045" thick molded TPO membrane preformed square boots are split to accommodate most common square penetrations and conduits and available in three standard sizes, **EverGuard® TPO Square Tube Wraps**, by GAF.

4. .070 thick molded penetration pocket to provide structure and foundation for the application of a pourable sealant for a variety of roof penetrations, weldable and 9" x 6" x 4" (l x w x h). **EverGuard® TPO Pourable Sealer Pocket**

5. Constructed from spun aluminum and preflashed using .055" thick smooth type, unreinforced thermoplastic polyolefin membrane. Available in a wide range of sizes to allow a proper fit into any size roofing drain. **EverGuard® TPO Drain** by GAF

6. Aluminum drain unit coated with a weldable TPO compound. TPO membrane can be heat welded directly to the drain body, resulting in a strong, secure installation. Each drain is fitted with a BlueSeal® mechanical drain seal for a secure, tight seal into the building drain system. Available in two sizes (3" and 4"), and custom sizes are available. **EverGuard® TPO Coated Metal Drain** by GAF®

E. ROOF EDGE ACCESSORIES

1. Coping system with pre-punched holes and snap-on design. Contains a metal clip that functions as a gutter to help channel water back onto the roof. Available for wall sizes 4" to 32" (102 mm – 813 mm). **M-Weld™ Snap-On Coping** (contains 20 gauge clip) or **M-Weld™ Snap-On Coping Plus** (contains 16 gauge clip) by GAF®.

2. Three piece fascia system with continuous galvanized steel spring cant, exterior decorative snap-on fascia and available in 10 foot lengths in standard or custom colors, **EverGuard® Snap-on Fascia** by GAF®.

3. Two piece fascia system with rigid terminator base plate and exterior decorative fascia cover available in 10 foot lengths in standard or custom colors for use with 45 mil and 60 mil only, **EverGuard® EZ Fascia** by GAF®.

4. Two piece fascia system with rigid extruded terminator base plate and exterior decorative snap-on fascia cover available in 10 foot lengths in standard or custom colors, **EverGuard® EZ Fascia EX** by GAF®.
   a) Standard Colors: Statuary Bronze Mission Red Forest Green Slate Blue Concord Cream Black Patina Green Mint Green Redwood Dove Gray Rocky Gray Bone White Siam Blue Rawhide Regal Blue Hartford Green Medium Bronze Chocolate Brown Turquoise Boysenberry Sandstone Ascot White Shale Gray Sierra tan
   b) Custom colors available

F. FIELD OF ROOF ACCESSORIES

1. Pre-manufactured expansion joint covers used to bridge expansion joint openings in a roof structure. Fabricated to accommodate all roof to wall and roof to roof applications, made of .060" reinforced TPO membrane, available in 5 standard sizes for expansion joint openings up to 8" wide. **EverGuard® TPO Expansion Joint Covers,** by GAF

2. .055" thick smooth type, unreinforced thermoplastic polyolefin membrane designed for use as a conforming membrane seal over T-joints in 60 and 80 mil membrane applications. **EverGuard® T-Joint Patches**, by GAF.

3. 1/8" thick extruded and embossed TPO roll 34" x 50', heat welds directly to roofing membrane. Unique herringbone traction surface. Available in gray or yellow, **EverGuard® TPO Walkway Rolls**, GAF.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that the surfaces and site conditions are ready to receive work.

B. Verify that the deck is supported and secured.

C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.

D. Verify that the deck surfaces are dry and free of ice or snow.

E. Verify that all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.

3.02 SUBSTRATE PREPARATION
(Select appropriate deck)

Option 1

A. Steel Deck
1. Metal decks must be a minimum uncoated thickness of 22 gauge (0.8 mm) and shall have a G-90 galvanized finish on all panels. FM requirements may supersede those set forth in this section. Consult the current FM Guide for more information.
2. Decks must comply with the gauge and span requirements in the current Factory Mutual FM Approval Guide and be installed in accordance with Loss Prevention Data Sheet 1-28 or specific FM approval.
3. When re-roofing over steel decks, surface corrosion shall be removed, and repairs to severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.
4. Code standards apply when their requirements exceed those listed here.

Option 2

B. Wood Deck (Plank / Heavy Timber)
1. Wood boards must be at least 1" nominal thickness and have a nominal width of 4'-6". Tongue and groove or shiplap lumber is preferred to square edge material since subsequent shrinkage or warping of square edge planks may cause ridging of the roof system above adjacent boards.
2. All boards must have a bearing on rafters at each end and be securely nailed.
3. Lumber shall be kiln dried.
4. Preservatives or fire retardants used to treat decking must be compatible with roofing materials.
5. Decking shall be kept dry and roofed promptly after installation.
6. Knotholes or large cracks in excess of ¼" (6 mm) shall be covered with securely nailed sheet metal.
7. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer's recommendations and standards of the APA/Engineered Wood Association prior to new roof application.
8. Code standards apply when their requirements exceed those listed here.

Option 3

C. Plywood Deck
1. Plywood sheathing must be exterior grade, minimum 4 ply, and not less than 15/32" thick.
2. Preservatives or fire retardants used to treat the decking must be compatible with roofing materials.
3. The deck must be installed over joists that are spaced 24" (61 cm) o.c. or less.
4. The deck must be installed so that all four sides of each panel bear on and are secured to joist and cross blocking. "H" clips are not acceptable.
5. Panels must be installed with a 1/8" to 1/4" (3mm – 6mm) gap between panels and must match vertically at joints to within 1/8" (3mm).
6. Decking should be kept dry and roofed promptly after installation.
7. Code standards apply when their requirements exceed those listed here.

3.03 INSTALLATION - GENERAL

A. Install GAF's EverGuard® TPO roofing system according to all current application requirements in addition to those listed in this section.

B. GAF EverGuard® TPO Specification #: TMANI60 (New Construction) or TMATI60 (Tear-Off)

C. Start the application of membrane plies at the low point of the roof or at the drains, so that the flow of water is over or parallel to, but never against the laps.

3.04 INSULATION - GENERAL

A. Do not apply roof insulation or roofing until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment. A vapor retarder coated lightly with asphalt may be applied to protect the inside of the structure prior to the insulation and final roofing installation. Before the application of the insulation, any damage or deterioration to the vapor retarder must be repaired.

B. Do not install wet, damaged or warped insulation boards.

C. Install insulation boards with staggered board joints in one direction (unless taping joint).

D. Install insulation boards snug. Gaps between board joints must not exceed ¼" (6 mm). All gaps in excess of ¼" (6 mm) must be filled with like insulation material.

E. Wood nailers must be 3-1/2" (8.9 cm) minimum width or 1" (25 mm) wider than metal flange. They shall be of equal thickness as the insulation, and be treated for rot resistance. All nailers must be securely fastened to the deck.

F. Do not kick insulation boards into place.

G. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.

H. Insulation should not be installed over new lightweight insulating concrete.

I. Do not install any more insulation than will be completely waterproofed each day.

3.05 INSULATION – BASE LAYER

A. Loose apply the base layer of insulation for subsequent layers to be simultaneously attached. Minimal fastening should be performed to avoid movement of the boards.

3.06 INSULATION – SUBSEQUENT LAYERS

A. The insulation must be securely attached to the roof deck. A minimum FMRC 1-60 attachment is recommended. Refer to FMRC Approval Guide for FM fastening patterns.

B. Use only fasteners with a minimum 3 inch (7.6 cm) stress plate when mechanically attaching insulation. Do not attach insulation with nails.

C. Do not install any more insulation than will be completely waterproofed each day.

3.07 MEMBRANE APPLICATION

A. Mechanically Attached:

1. Place membrane so that wrinkles and buckles are not formed. Any wrinkles or buckles must be removed from the sheet prior to permanent attachment. Roof membrane shall be mechanically fastened immediately after it is rolled out, followed by welding to adjacent sheets.
2. Overlap roof membrane a minimum of 6" for side laps and 3" for end laps.
3. Install membrane so that the side laps run across the roof slope lapped towards drainage points.
4. All exposed sheet corners shall be rounded a minimum of 1".
5. Use full width rolls in the field of roof and half width rolls in the perimeter and corner region of the roof and mechanically fastened in the side lap area to the roof deck.
6. Membrane laps shall be heat-welded together. All welds shall be continuous, without voids or partial welds. Welds shall be free of burns and scorch marks.
7. Weld shall be a minimum of 1-1/2" in width for automatic machine welding and a minimum 2" in width for hand welding.
8. All cut edges of reinforced membrane must be sealed with EverGuard® TPO Cut Edge Sealant.
9. The membrane shall be mechanically fastened in the side lap area to the roof deck with appropriate Drill-Tec™ fasteners and plates as required by roof system specification and/or Factory Mutual classification requirements.
10. The metal plates must be placed within ¼" to ½" of the membrane edge. Plates shall not be placed less than ¼" from the membrane edge.
11. In the corner regions, additional fasteners shall be installed through the perimeter membrane to form a grid pattern, with an 8" (40.5 cm) wide EverGuard® TPO reinforced membrane flashing-strip welded over the additional fasteners. Corners include both outside and inside corners that measure 75 - 105 angle degrees.
12. Membrane attachment to the roof deck is required at locations of deck angle changes in excess of five (5) angle degrees (1" in 12").
13. Supplemental membrane attachment is required at the base of all walls and curbs, and where the angle of the substrate changes by more than ten (10) degrees (1" in 12"). Roofing membrane shall be secured to the structural deck with screws and plates of the same type and spacing used for in-lap attachment. The screws and plates must be installed no less than ½" from the membrane edge. Alternatively, the roofing membrane may be turned up the vertical plane a minimum of 3" and secured with screws and termination bar. Fastener spacing is the same as is used for in-lap attachment. The termination bar must be installed within 1-1/2" to 2" of the plane of the roof membrane, with a minimum of 1" of membrane extending above the termination bar.
14. Supplemental membrane attachment to the structural deck is required at all penetrations. Roofing membrane shall be secured to the deck with appropriate Drill-Tec™ screws and plates.
15. Fasteners must be installed to achieve the proper embedment depth. Install fasteners without lean or tilt.
16. Install fasteners so that the plate or termination bar is drawn down tightly to the membrane surface. Properly installed fasteners will not allow the plate or termination bar to move (underdriving), but will not cause wrinkling of the membrane (overdriving).

3.08 FLASHINGS

A. General:
   1. All penetrations must be at least 24" (61 cm) from curbs, walls, and edges to provide adequate space for proper flashing.
   2. Flash all perimeter, curb, and penetration conditions with coated metal, membrane flashing, and flashing accessories as appropriate to the site condition.
   3. All coated metal and membrane flashing corners shall be reinforced with preformed corners or non-reinforced membrane.
   4. Hot-air weld all flashing membranes, accessories, and coated metal. A minimum 2" wide (hand welder) weld or minimum 1 - 1/2" automatic machine weld is required.
   5. All cut edges of reinforced membrane must be sealed with EverGuard® TPO Cut Edge Sealant.
   6. Consult the EverGuard® *Application and Specifications Manual* or GAF Contractor Services for more information on specific construction details, or those not addressed in this section.

B. Coated Metal Flashings:

1. Coated metal flashings shall be formed in accordance with current EverGuard construction details and SMACNA guidelines.
2. Coated metal sections used for roof edging, base flashing and coping shall be butted together with a ¼" gap to allow for expansion and contraction. Hot-air weld a 6" wide reinforced membrane flashing strip to both sides of the joint, with approximately 1" on either side of the joint left un-welded to allow for expansion and contraction. 2" wide aluminum tape can be installed over the joint as a bond-breaker, to prevent welding in this area.
3. Coated metal used for sealant pans, scupper inserts, corners of roof edging, base flashing and coping shall be overlapped or provided with separate metal pieces to create a continuous flange condition, and pop-riveted securely. Hot-air weld a 6" wide reinforced membrane flashing strip over all seams that will not be sealed during subsequent flashing installation.
4. Provide a ½" hem for all exposed metal edges to provide corrosion protection and edge reinforcement for improved durability.
5. Provide a ½" hem for all metal flange edges whenever possible to prevent wearing of the roofing and flashing membranes at the flange edge.
6. Coated metal flashings shall be nailed to treated wood nailers or otherwise mechanically attached to the roof deck, wall or curb substrates, in accordance with construction detail requirements.

C. Reinforced Membrane Flashings:
1. The thickness of the flashing membrane shall be the same as the thickness of the roofing membrane.
2. Membrane flashing may either be installed loose or fully adhered to the substrate surface in accordance with "Construction Detail Requirements".
3. Where flashings are to be fully adhered, apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.
4. Apply the adhesive only when outside temperature is above 40°F. Recommended minimum application temperature is 50°F to allow for easier adhesive application.
5. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.

D. Un-reinforced Membrane Flashings:
1. Un-reinforced membrane is used to field-fabricate penetration or reinforcement flashings in locations where preformed corners and pipe boots cannot be properly installed.
2. Penetration flashings constructed of un-reinforced membrane are typically installed in two sections, a horizontal piece that extends onto the roofing membrane and a vertical piece that extends up the penetration. The two pieces are overlapped and hot-air welded together.
3. The un-reinforced membrane flashing shall be adhered to the penetration surface. Apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.

E. Roof Edges:
1. Roof edge flashings are applicable for gravel stop and drip edge conditions as well as for exterior edges of parapet walls.
2. Flash roof edges with metal flanges nailed 4" O.C. to pressure-treated wood nailers. Where required, hot-air weld roof membrane to coated metal flanges.
3. When the fascia width exceeds 4", coated metal roof edging must be attached with a continuous cleat to secure the lower fascia edge. The cleat must be secured to the building no less than 12" O.C.

4. Alternatively, roof edges may be flashed with a 2-piece snap on fascia system, adhering the roof membrane to a metal cant and face nailing the membrane 8" on center prior to installing a snap-on fascia.
5. Flash roof edge scuppers with a coated metal insert that is mechanically attached to the roof edge and integrated as a part of the metal edging.

F. Parapet and Building Walls:
1. Flash walls with EverGuard TPO membrane adhered to the substrate with bonding adhesive, loose applied (Less than 24" in height) or with coated metal flashing nailed 4" on center to pressure-treated wood nailers.
2. Secure membrane flashing at the top edge with a termination bar. Water Block shall be applied between the wall surface and membrane flashing underneath all exposed termination bars. Exposed termination bars shall be mechanically fastened 8" on center; termination bars that are counter flashed shall be fastened 12" on center.
3. Roof membrane must be mechanically attached along the base of walls with screws and plates (deck securement) or screws and inverted termination bar (wall securement) at the following rate:

Mechanically Attached Systems	Per in-lap on center spacing, with a 12" maximum

4. All coated metal wall flashings and loose applied membrane flashings must be provided with separate metal counterflashing, or metal copings.
5. Metal counterflashing may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with FlexSeal® roofing cement or FlexSeal® caulk grade.
6. Flash wall scuppers with a coated metal insert that is mechanically attached to the wall and integrated as part of the wall flashing.

G. Curbs and Ducts:
1. Flash curbs and ducts with EverGuard TPO membrane adhered to the curb substrate with bonding adhesive, loose applied (Less than 18" in height) or with coated metal flashing nailed 4" on center to pressure-treated wood nailers.
2. Secure membrane flashing at the top edge with a termination bar. Water Block shall be applied between the curb/duct surface and membrane flashing underneath all termination bars. Exposed termination bars shall be mechanically fastened every 8"o.c.; termination bars that are counter flashed shall be fastened 12" on center.
3. Roof membrane must be mechanically attached along the base of walls with screws and plates (deck securement) or screws and inverted termination bar (wall securement) at the following rate:

Mechanically Attached Systems	Per in-lap on center spacing, with a 12" maximum

4. All coated metal curb flashings and loose applied membrane flashings must be provided with separate metal counterflashing, or metal copings.
5. Metal counterflashing may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with FlexSeal® roofing cement or FlexSeal® caulk grade.

H. Roof Drains:
1. Roof drains must be fitted with compression type clamping rings and strainer baskets. Original-type cast iron and aluminum drains, as well as retrofit-type cast iron, aluminum or molded plastic drains are acceptable.
2. Roof drains must be provided with a minimum 36" x 36" sump. Slope of tapered insulation within the sump shall not exceed 4" in 12".
3. Extend the roofing membrane over the drain opening. Locate the drain and cut a hole in the roofing membrane directly over the drain opening. Provide a ½" of membrane flap extending past the drain flange into the drain opening. Punch holes through the roofing membrane at drain bolt locations.
4. For cast iron and aluminum drains, the roofing membrane must be set in a full bed of water block on the drain flange prior to securement with the compression clamping ring. Typical water block application is one 10.5 ounce cartridge per drain.

5. Lap seams shall not be located within the sump area. Where lap seams will be located within the sump area, a separate roof membrane drain flashing a minimum of 12” larger than the sump area must be installed. The roof membrane shall be mechanically attached 12” on center around the drain with screws and plates. The separate roof drain flashing shall be heat welded to the roof membrane beyond the screws and plates, extended over the drain flange, and secured as above.
6. Tighten the drain compression ring in place.

3.09 TRAFFIC PROTECTION

A. Install walkway rolls at all roof access locations and other designated locations including roof-mounted equipment work locations and areas of repeated rooftop traffic.

B. Walkway pads must be spaced 2" apart to allow for drainage between the pads.

C. Heat-weld walkway rolls to the roof membrane surface continuously around the perimeter of the roll.

D. Walkway rolls may be installed with TPO primer and 3” seam tape.
1. Roll or brush the TPO primer on the back of the TPO pad along the edges and down the middle length of the pad.
2. Clean and prime the roof membrane where the pad will be installed.
3. Install tape to the back of the cleaned area of the pad and roll in with a silicone hand roller.
4. Remove release paper and install the tapes pads directly onto the roof membrane. Roll pads to secure in place

3.10 ROOF PROTECTION

A. Protect all partially and fully completed roofing work from other trades until completion.

B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.

C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.

D. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.

3.11 CLEAN-UP

A. All work areas are to be kept clean, clear and free of debris at all times.

B. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.

C. All tools and unused materials must be collected at the end of each workday and stored properly off of the finished roof surface and protected from exposure to the elements.

D. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.

E. Properly clean the finished roof surface after completion, and make sure the drains and gutters are not clogged.

F. Clean and restore all damaged surfaces to their original condition.

END OF SECTION